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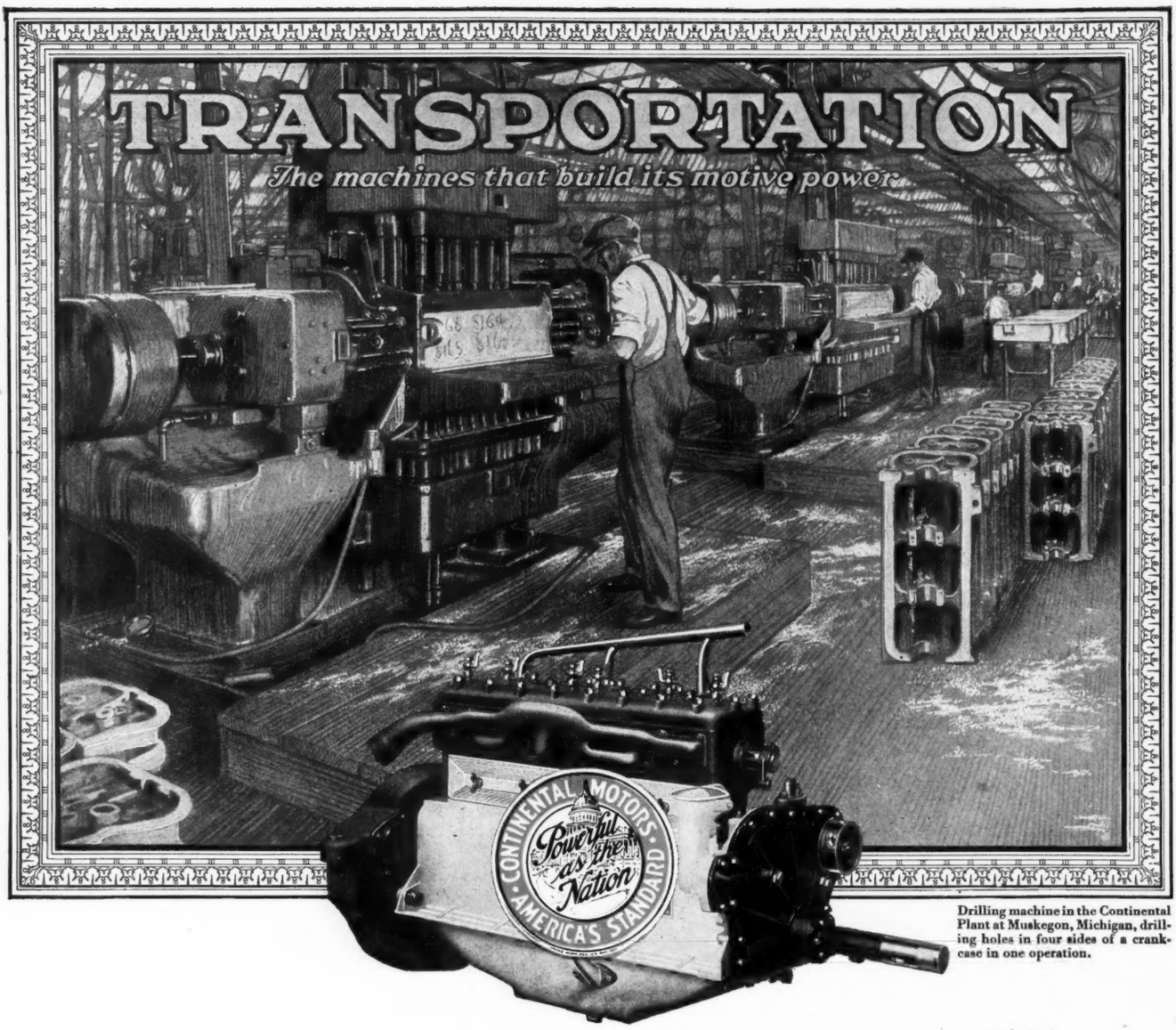

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AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

VOL. XLIV. NEW YORK—THURSDAY, APRIL 28, 1921 No. 17

Our Government and Business

High taxes and low business totals have combined to interest industrial leaders in government as never before, and coincidentally the government leaders are more inclined to unbend to business. Results should be beneficial to both interests.

By Clyde Jennings

BUSINESS men and business interests have accepted very generally the invitation of the Harding Administration that business take more interest in government for the dual purpose of assisting Government and of getting more benefit from Government. The idea is abroad that this is to be a business administration—for the benefit of both business and Government.

The present is opportune for such a blending of interests. Before the war Government cost so little that business did not pay much attention to it. It was too cheap. Anything cheap never commands much respect. The smokers, liquor drinkers and consumers of imported articles were paying the bills; the politicians were doing the planning and the fairly well paid employees in government bureaus were doing the work. It was all very satisfactory to the business man, so why worry.

Then came the war and Government called a lot of business men to Washington to help run things. These men were paid an average of $1 a year. Most of them went there thinking that they would settle the problems of Government and war in a few days and then go back home and get busy again with their own business. But a good many of them remained in Washington until the armistice was signed and had the busiest days of their lives in trying to attend to Government business. A whole lot of men found that Government business was real business, especially in war time.

Then these men got back home and the next interest in Government was caused by their tax bills. Excess profit taxes, income taxes, corporation taxes, luxury taxes on the most ordinary articles, a series of questionnaires and, likely, investigators in the plant were next in order. These incidents made business men think more and more of Government. A good many of them concluded that the Administration in power was not a good one or Government would not cost so much. So they sought a change.

Now we have the change. The new Administration has started working quite nicely with business. But Government is still quite costly, so costly that business wants to know what makes it cost so much. They are interested, and good many business men are going to Washington and are sending their agents there to reduce the price of Government.

They have been received with open arms. Government is openly courting help and advice, to a certain degree. When this advice conflicts with what is desired by the instrument of Government—for the politician is still on the job—it is not so welcome. Sales tax suggestions for instance.

Herbert Hoover, as Secretary of Commerce, is to all appearances the special liaison officer of the ad-

ministration with business. Secretary Hoover is studying all lines of business and his own department with a view of making each more valuable to the other. He is striving to learn from business what it wants to know from his Department—and from Government in general if you please.

Also, he is striving to learn what it is possible for his department—and for Government—to do for business. He has indicated that he thinks it entirely possible that he can obtain much information that is really vital to business but which the industrial organizations in many lines have been unable to obtain.

Secretary Hoover's general program in aid to business is quite well defined. Before he took the Cabinet job he was directing a survey to lessen industrial waste. It is no secret that he still holds that industrial waste is a considerable factor in high prices. The work he so well started through his engineering associates is continuing and he hopes to further this work as Secretary of Commerce.

Industrial waste, as Secretary Hoover sees it, is chiefly "blindfold production"—if we may coin a phrase. This means that many industries are going but they do not know where they are going. They are depending solely upon chance to find signposts at the cross roads.

Sometimes the signpost is lettered sufficiently plain that the manufacturer sees the direction and has time to change his course. But usually he is going at such speed, or he is talking so earnestly with his companions, that he does not see the sign in time to make a good turn. As a result he wastes a lot of time getting back on the right road. He wastes fuel by going full speed ahead after the demand has lessened; or perhaps, that he has not estimated his market and the warehouses are full; or perhaps public fancy has turned away from the particular style of article he makes; or—well all manufacturers know the dangers.

The result is that there is a waste of manufacturing labor; there is waste in carrying heavy inventories; there is a very heavy waste in the unstable character of employment in industries and establishments that follow only current market reports in their quantity and kind of output.

It is Secretary Hoover's idea that almost any manufacturing problem can be stabilized by a better examination into the probable consumption over an extended period by a study of consumption figures. This in turn will make the demand all through the industries, from raw material to labor in the final distributing stations, more equitable.

Here comes in one of Secretary Hoover's strong points in this program: That of stabilizing the demand for labor, so that there will be less unemployment and consequently less economic waste. It is decidedly a human factor and the beneficial effect it would have on wage controversies can be seen at a glance. All manufacturers know how much less troublesome is the labor problem in an industry that provides 50 weeks of employment a year than one which is entirely seasonable and whose factory staff will vary from a long shut down period to a crowded workroom, with two or three shifts at other seasons of the year. Enforced idleness is always an important factor in wage scales.

Secretary Hoover is quite willing to aid any and all industries in this stabilization work through his department. He discussed this problem with the business paper editors a few days ago and asked what figures were wanted. First, of course, export and import figures came up for discussion, chiefly because they are now being given out and it is a less problem to remedy defects in a present practice than it is to establish an entirely new activity. But the additional aids to business are on the books to be worked out.

The important question, however, is not what Secretary Hoover and the present administration plan to do, or what they want to do, but WHAT CAN BE DONE.

All business men know that investigation problems, research activities and in fact all activities of this sort require money.

Secretary Hoover is quite plain in his statements that what his department will do is not so much a problem of plans as of money. His greatest problem is to get money with which to pay clerks for making the computations that he knows are desired and for establishing new sections in his bureaus, under charge of competent men, for the initiation of new activities.

At this point the treatment of this subject appears to take a slightly different turn. We will admit for the present that:

The Administration is sold on aiding business.

Business is sold on the possibility of being aided by government.

Business wants the costs of government reduced. The Administration was to lower costs, if possible; obtain fair treatment for people who patronize business, and co-operate with business in every legitimate way.

But here comes a new angle. First of all, Government is political; an Administration depends entirely for its success and continuance upon popular opinion. This popular opinion may be wrong, but the Administration must meet it. Actual good that Administration may do for business is secondary to popular opinion.

Business men generally cannot blame the individual units of the Administration (and the Administration as a whole) for looking to the life line first. **There are few, if any, men in public life who put the cause before the man.**

The idea of public men, first of all, is self preservation, and you cannot blame them for that. Put yourself in the place of the politician and reason this way:

"I want to do the most good I can while in office. I want to help business and consequently help the country and the people, because business is the life blood of the nation. I can only do this by staying in office. If I am defeated at the next election, Jones will succeed me. He does not favor any of the plans that I favor. My plans are better than his. If I can get my plans started this term I must come back next term to carry them through. Consequently, while starting my plans for good, I must look out for votes at the next election."

Under the ideal of making the cause bigger than the man, this course of reasoning would be fallacious. **Under the expediency and ideals of politics it is not. Business to-day must take conditions as it finds them, until there is time and opportunity to educate the great mass of voters to mark their ballots with greater idealism.**

Our forefathers, especially those who lived in Hamlin Garland's great west, studied backfires with a great deal of care. So do the politicians of the present day. So should business men. The backfire is the greatest weapon in the electoral government.

The hope of business to-day is not so much to consult with the Administration as to have some in-

fluence with the voters at home, so that business can start backfires in the home district.

The power of Government lies in Congress. And it is well that it does. You may obtain the co-operation of the powers that be in Government or the Administration, but without Congress these powers are not of much use. Witness Secretary Hoover, anxious and willing to aid business, who cannot enlarge the activities of his department until he can obtain the money.

You all have heard of the man who was forced by necessities of domestic peace, to take his pay envelope home unopened. You have heard many tales of woe from your own employes on this very subject.

But to-day administration executives are bound by much closer purse ties than the hen-pecked man. The executives do not even get the pay envelope until Congress has closely inspected the contents. And Congress is quite proud of this power.

The power of business to-day lies with the home Congressmen. The business man who expects to take his own part in the effort to get Government to come to the aid of business needs have on his desk a list of the local Congressmen, Representatives and Senators, and the chairmen of the various committees. He must use this list very often. He should write to these men on subjects that he wants acted upon.

Also the business man must take his friends into his confidence. He must get them to write on the subjects that he is talking about.

Of course, the head of a big business organization has much power in the world and he often feels that he wields much influence, but he should remember that unless he exerts this influence **he is only one voter on election day.** Some business men are so regarded by their helpers in business and at home, so that every man and woman in their employ delights in learning **"how the boss is going to vote" so that they may kill his vote.** It is only on election day that the humble helper is fully equal to "the boss" in public affairs. And, believe me, this fact is well known to the servitor. Perhaps the servitor has the most power in the election, at that. Remember in "Peg o' My Heart" the lesson of the two dogs. Michael was forced to sleep in the stable, but when it came to grips on the lawn, Michael was much the better of the two dogs. Politics is a good deal of a rough and tumble fight, and Congressmen and other politicians are likely to know just how much influence a man wields on election day. Some politicians are shrewder than they look.

Business cannot get what it wants from politics—which unfortunately is to-day a practical synonym for Government—unless it plays with politics all of the time. Business must learn to discriminate in men and platforms; especially men, rather than in party names.

Business to-day has the greatest opportunity in the history of this Government. What business realizes from this opportunity is solely up to the men of business, for business collectively does not vote and it is votes that count in the last analysis.

Business organizations have a great potential power. To-day every business or industrial organization should be judged solely as it co-operates with Government for the betterment of business and the intelligence with which it works to interest Government in business and the men of business in Government.

Association work is co-operation. An association is powerful only as its members work with each other for the same purpose. Then the association's power is for good or evil, as its purpose is a worthy or a selfish one. The fact that the Administration has advised an inquiry into the activities of certain business organizations should not be construed as an overt act against business. Perhaps these associations should be inquired into. We hope not, but associations are as likely to be selfish and unworthy as men, and a good many men should be inquired into.

This act on the part of the Administration should not be construed entirely as an unfriendly act. We do not believe that there is a business man to-day who is willing to risk his reputation in giving to all business organizations a "clean bill of activities."

THIS article is not in any sense a presentation of an ideal of government. It is an expression of opinion as to present expediency. It should be the ideal of every American citizen to raise the standard of government to a point where the present political methods will not be paramount; then the best interests of the people will be the aim of every member of the legislative, executive and administrative branches of government.

This desirable state of affairs will be reached only when voters are as careful in their selection of legislative candidates as they are of the men with whom they have personal dealings.

The fact that the Administration is doing a little housecleaning only illustrates the more the fact that Government is politics—often mob rule. It cannot be denied that the people generally believe some business associations are instruments established solely for the purpose of robbing the consumer. **If that belief is true, then a housecleaning is needed. If it is not true, the business represented in the associations should welcome an opportunity to tell the truth.**

Some very strange things have been uncovered in association inquiries this year and perhaps more of them will be uncovered during the year. This should not discourage the effort for honest co-operation between the right kind of business men and Government.

Have you the names of all local legislators on your desk?

Taxes and Registrations in England

CONSIDERABLE interest attaches to the working out of the new motor vehicle registration law which went into effect in England this year. The London *Times* of March 11 reports that "the revenue from the new motor taxation . . . has been coming in remarkably well and from the licenses issued during January and February it is evident that the estimates of £8,000,000 as the yield of the tax will be reached, if not exceeded."

The final registration figures are not yet in, but should furnish later the first really close estimate of the number of cars in the United Kingdom. The only information available at present states that "while comparative figures are to some extent deceptive, for all motor vehicles must now be registered in the district in which they are normally kept, the increase in vehicles registered in some areas as compared with last year is already large."

Factors to Be Studied in Merchandising Analysis

The advantages to be gained from a systematic and scientific study of the merchandising problem are being recognized by many manufacturers. Work along the lines of territorial analysis and the establishment of quotas is being recognized as essential. One company's start described

THE marketing phases of industry have never received the careful and scientific treatment accorded the engineering and production phases in the past. Intensive merchandising has now become almost an essential to existence, however, and the scientific methods which have proved so valuable in the shop and the engineering department must be brought to bear upon the efforts of the sales department.

With this fact in mind, the charts recently prepared by the Commercial Research Department of the Franklin Automobile Co. are of special interest. These charts, which are presented herewith, were prepared for use in connection with sales analysis and production plans and are of value as being the result of an intelligent and practical guess as to what the future holds in store for the automobile industry.

The chief conclusion presented by the charts is that there will be nearly 31,000,000 cars and trucks registered and 5,300,000 produced in the United States in 1940, but the process by which this conclusion was determined and the production probabilities for the next twenty years also comprise an important part of the analysis.

The figures from which the various curves are drawn all go back to the data shown in Fig. 1.

The chief feature is that this forecast is based on a study of ratios of registration to population, whereas most similar forecasts are made by merely plotting past statistics and extending the curves on that basis. The forecast for 1940 is based on an assumption of ratio of registration to population for 1940, and is therefore of little interest as compared with the forecasts obtained thereby for the next few years. The theory is that if the assumption of ratio is made for a date far enough ahead, even a material error in that assumption will not throw off to any

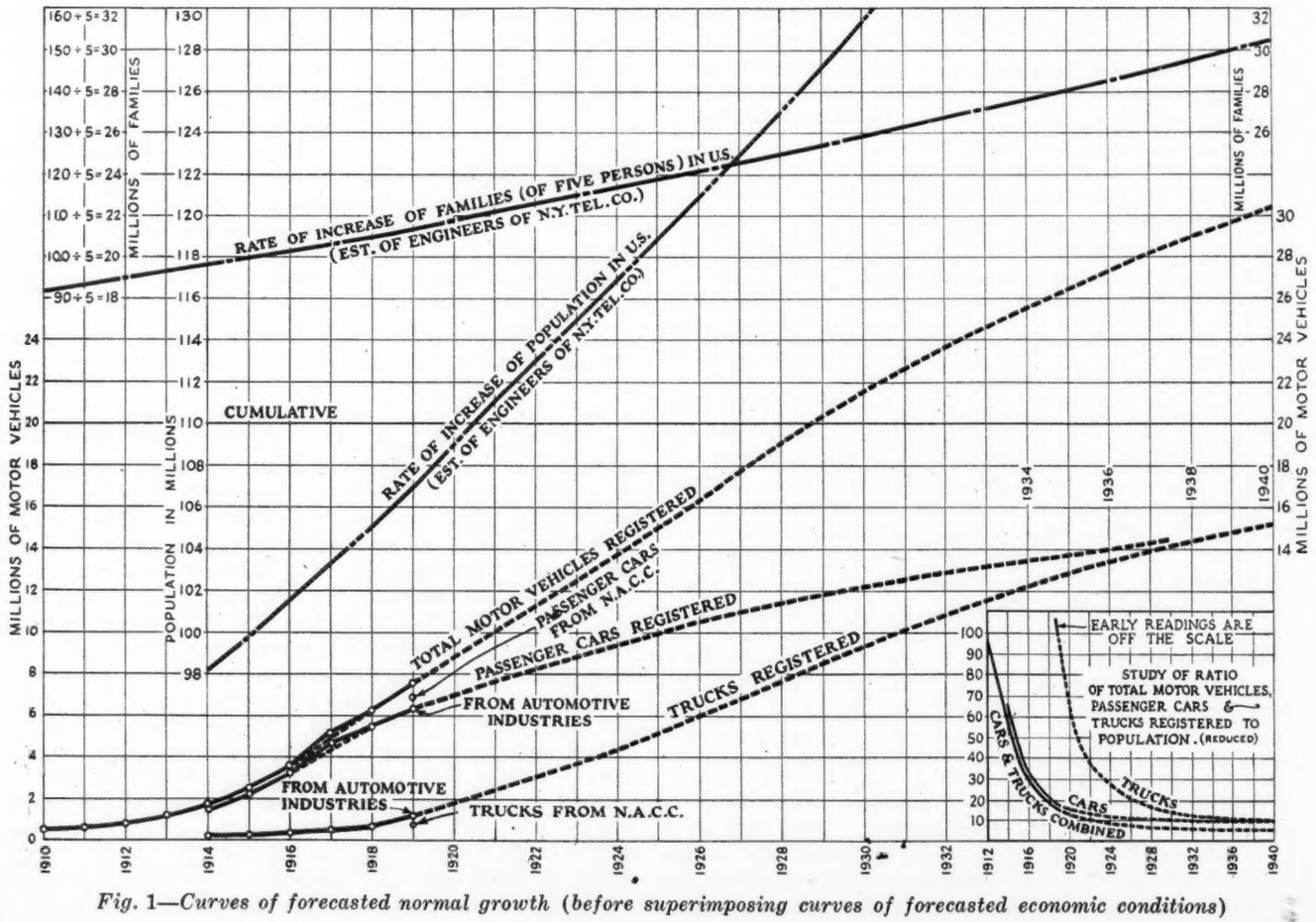

MILLIONS OF MOTOR VEHICLES
MILLIONS OF FAMILIES
POPULATION IN MILLIONS
RATE OF INCREASE OF FAMILIES (OF FIVE PERSONS) IN U.S.
(EST. OF ENGINEERS OF N.Y.TEL.CO.)
RATE OF INCREASE OF POPULATION IN U.S.
(EST. OF ENGINEERS OF N.Y.TEL.CO.)
CUMULATIVE
TOTAL MOTOR VEHICLES REGISTERED
PASSENGER CARS FROM N.A.C.C.
PASSENGER CARS REGISTERED FROM AUTOMOTIVE INDUSTRIES
TRUCKS REGISTERED
FROM AUTOMOTIVE INDUSTRIES
TRUCKS FROM N.A.C.C.
EARLY READINGS ARE OFF THE SCALE
STUDY OF RATIO OF TOTAL MOTOR VEHICLES, PASSENGER CARS & TRUCKS REGISTERED TO POPULATION. (REDUCED)
CARS & TRUCKS COMBINED
TRUCKS
CARS

Fig. 1—Curves of forecasted normal growth (before superimposing curves of forecasted economic conditions)

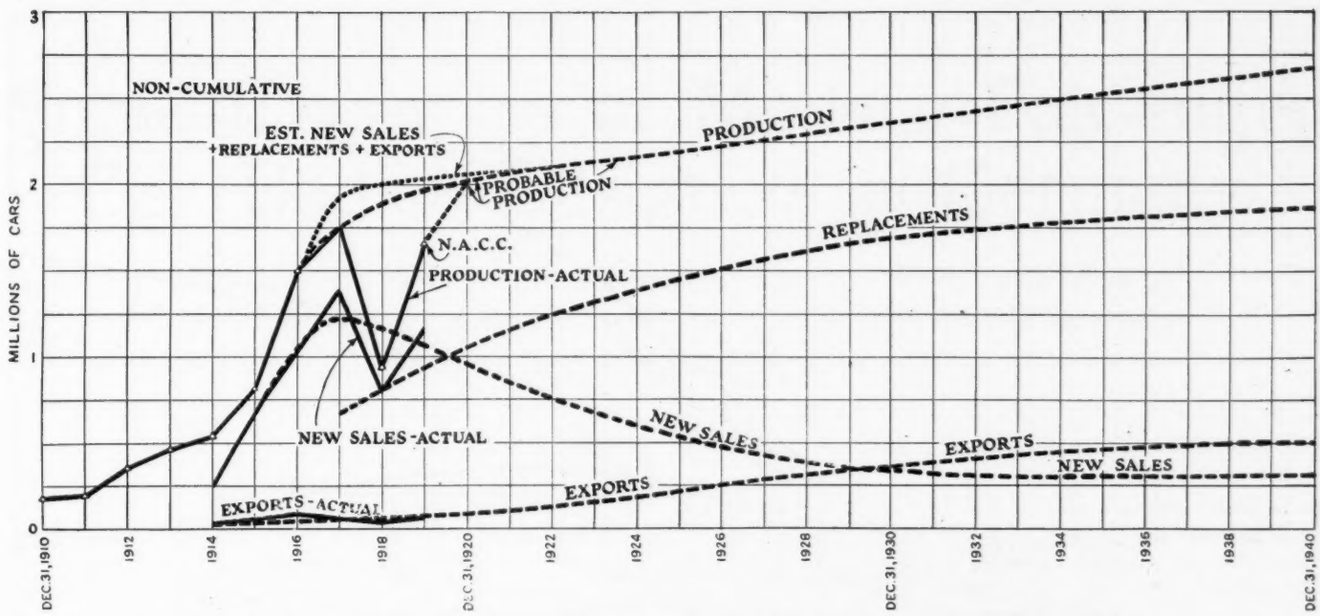


Fig. 2—Preliminary forecast of passenger car production (new sales + replacements + exports)

great extent the forecast for the next few years. This was tried out in this case and found to be true.

The curves were built up on that basis, in the following manner:

The highest ratios of motor vehicles to population in 1919 were:

California	1 car for every	6.07 persons
Iowa	1 car for every	6.12 persons
Nebraska	1 car for every	6.54 persons

The lowest ratio was in Mississippi, which had 1 car for every 45 persons, while the average for the country was 1 vehicle for every 14.14 persons—or 1 vehicle for every three families.

A superficial study of conditions then led to the assumption that in 1940 the average for the United States would be 1 vehicle for every 5 persons, so divided that there would be 1 passenger car and 1 truck for every 2 families.

Ratio Chart

The small chart in lower right-hand corner of Fig. 1 shows the ratio of the total registration, passenger car registration, and truck registration to population. The solid part of the lines represent actual figures to date, while the dotted parts of the lines are the predicted figures to 1940, based upon the assumption just discussed.

The readings thus obtained were then applied to the population curves furnished by the New York Telephone Co. Thus the curves for estimated vehicles registered were drawn.

It will be noted that the curves for passenger cars and trucks are constructed on the assumption that there will be an equal number of cars and trucks in the country in 1940; that is, one car and one truck for every two families.

For the purposes of this calculation, population rather than business houses, factories, etc., was used as a unit of measure for both cars and trucks, because it is, in the final analysis, the determining factor regarding future needs of the country.

On the basis of these curves shown in Fig. 1, the curves shown in Figs. 2 and 3 were constructed. It should be noted, however, that there has been no attempt to take into account such events as the present industrial depression or other economic circumstances which would disturb the natural progress of business. This attitude is warranted, since such depressions have only a temporary effect upon marketing problems.

The forecast of passenger car production is shown in Fig. 2. Again the solid lines show past figures, while the broken lines are the predicted trends. The war caused the radical dip in the production curve for 1918, but the dotted line above shows what the normal production would probably have been, based upon the theoretical standards upon which the future predictions are made.

Bases of Curves

Certain other factors should be explained in connection with Figs. 2 and 3. The average life of a car at present is figured as being between five and six years. But as automobile manufacture improves each year, the average life of a car will probably increase. It is assumed for the purposes of this calculation that the average life of a car in 1940 will be ten years and the replacement curve is drawn on this basis.

In drawing the export curve, it was assumed that the export market has a limited capacity in that manufacturing and assembly plants will be established in a foreign country after a certain point has been reached.

According to the prediction of this chart it will be noted that passenger car production in 1940 will reach about 2,680,000, while truck production at that time will have passed the 3,000,000 mark.

It is interesting to note on the passenger car chart that the replacement business has already become greater than the new sales, and that exports are expected to pass new sales about 1929.

In the truck field, however, it is predicted that new sales will be greater than replacements until 1925, while exports will not equal new sales until 1938.

Large Replacement

According to this forecast there will be more than a million and a half passenger cars needed for replacement alone after 1926, while the estimate gives necessary replacements for 1921 at about 1,300,000 passenger cars and about 300,000 trucks. This would indicate a thriving business for the automobile industry without taking into account the new sales which undoubtedly can be made.

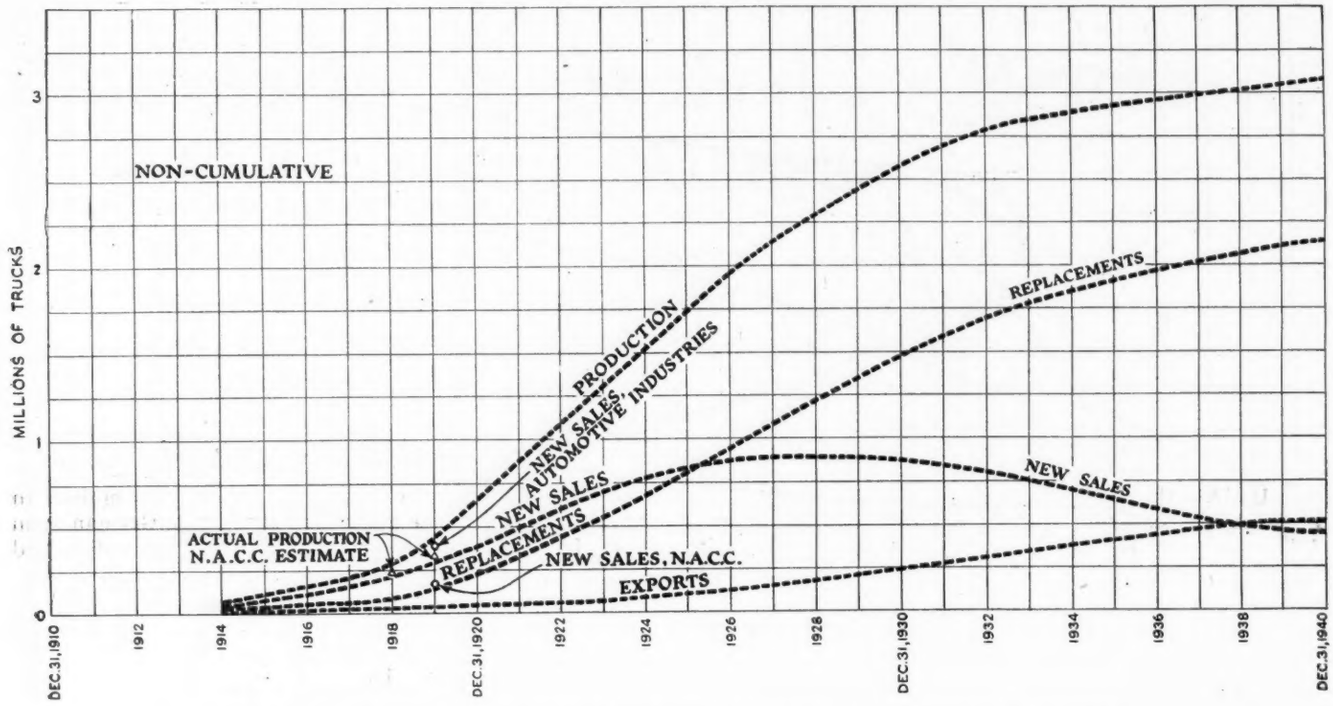


Fig. 3—Preliminary forecast of truck production (new sales + replacements + exports)

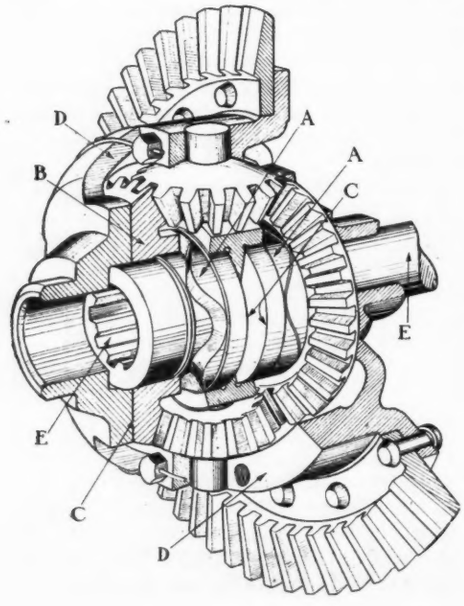
While such estimates as this cannot, of course, be expected to predict the future with strict accuracy, they are very much worth while as a general basis upon which to speculate as to the best plans to make. The charts are presented here as an example of the way in which one automobile manufacturer is going about a study of the problem and as a preliminary report on the results which have been attained.

A Sinusoidal Type Differential

A POSITIVE-DRIVE differential of the sinusoidal type designed by A. T. Nogrady has been the subject of investigation by the General Motors Co. and other concerns in the industry. The differential is fitted with the bevel pinion and side gears in the usual manner. However, the bevel gears are fitted with either helical splines or sinusoidal cams that engage with external and internal members, the latter a portion of a member fitted to, or integral with, the main axle shaft.

When the traction in either of the rear wheels varies, the cam shown in the drawing at *A* tends to thrust the differential bevel gear, or side gear *B*, against clutch faces *C*, thereby setting up a frictional load which is transmitted to the cage *D* as a torsional load, and thus to the main axle shafts *E*.

When operating under ordinary conditions, the effect due to the cam is to thrust the side gears inward and away from the provision for friction, and since the clutching faces are brought to bear one against the other, the thrust is equalized between the inner and outer clutching faces.



Nogrady differential. A, cam; B, differential bevel gear; C, clutch faces; D, cage; E, axle shafts

Automobile Industry in Canada

THE following brief statistics are of interest as showing the present size and development of the automobile industry in Canada, compiled by the Dominion Bureau of Statistics:

Canadian companies manufacturing cars...	10
Cars manufactured since 1916.....	351,000
Annual necessary replacement.....	80,000
Value of 1920 production of passenger cars.	$84,500,000
Dealers in Canada 1920.....	5,500
Persons employed in automobile and allied industries	80,000
Persons involved, including families of workmen	400,000
Capital investment in dealers' companies...	$43,000,000
Capital investment in manufacturing companies	$110,000,000

Some Examples of Modern Passenger Car Bodies Designed in Germany

Result of isolation during the war seen in distinctive designs with embodying V-type radiator and windshield, concealed top and divided rear seat. Some touring bodies have light detachable limousine top.

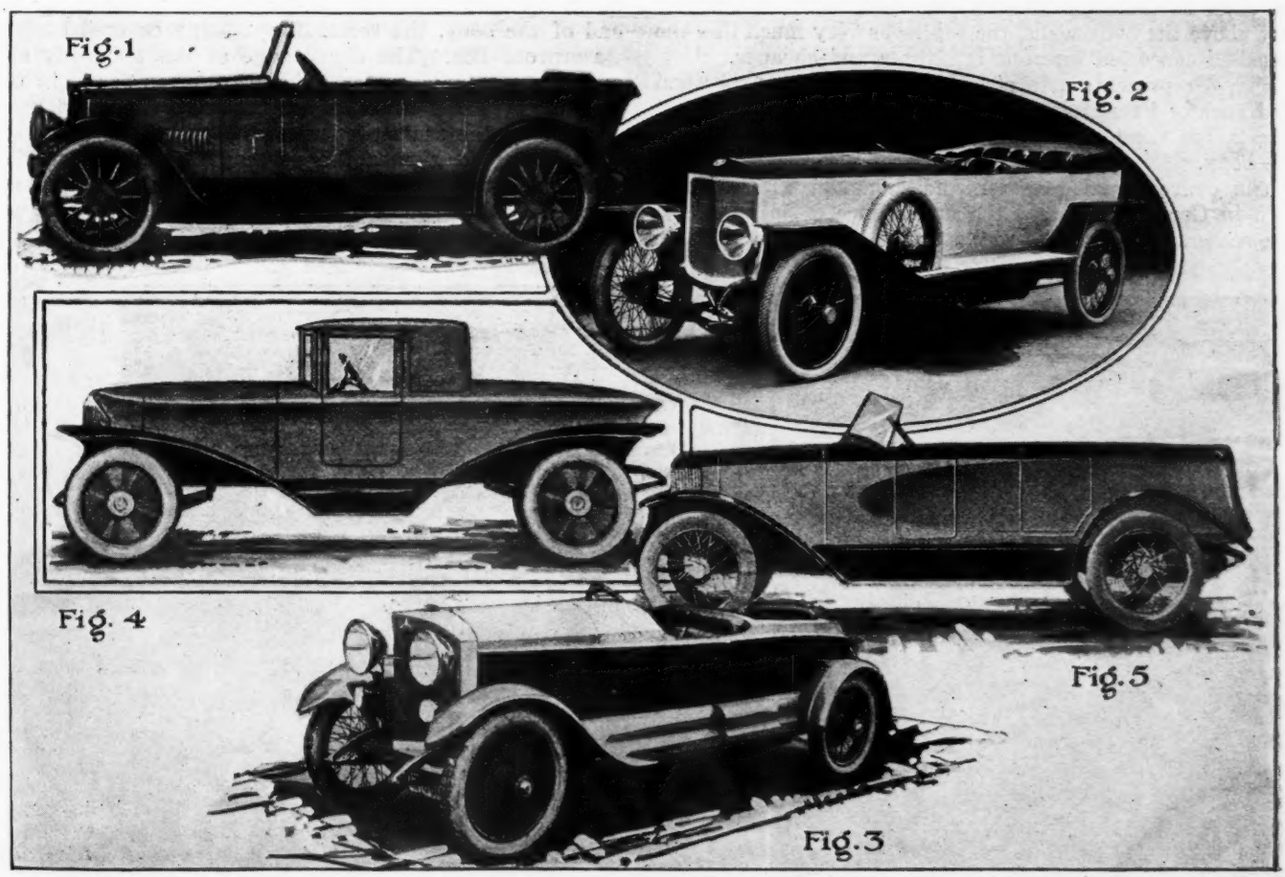
By Benno R. Dierfeld

DURING the war German body designers were completely shut off from foreign influences, and as a result the bodies of modern German cars are quite distinctive in design. The differences as compared with American and other foreign bodies are particularly accentuated in open bodies, but can also be found in closed cars. They are:

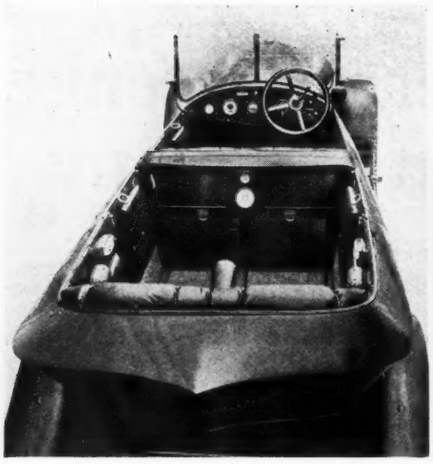
1. V-shaped radiator.
2. V-shaped windshield.
3. Sharp horizontal top line, running from the upper part of the engine bonnet to the rear end of the body.
4. Two-color finish with the horizontal top line mentioned above as line of demarcation.
5. Top concealed in the rear part of the body.
6. Rear seats generally divided by an arm rest and only wide enough for two passengers.

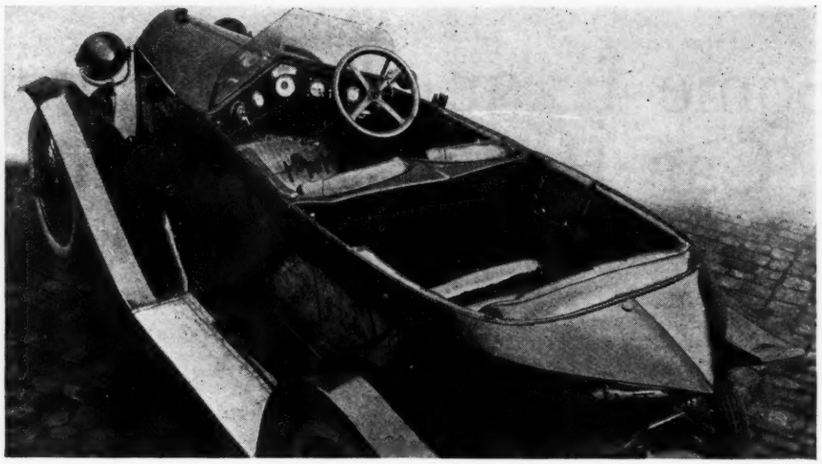
Of course all these features are not always combined in one body, but they are found in most of the German open cars. In the following a number of bodies manufactured by German automobile factories and body works are briefly described.

Fig. 1 shows a typical open body built by Benz. The car seats six passengers and the two rear seats are separated by a central arm rest. The radiator is V shaped, as in all German cars. This construction, while expensive and more difficult to repair than the ordinary flat radiator, gives the car a speedy, rakish appearance. For the same reason the windshield is V-shaped, a design that also reduces the wind resistance, and the top is concealed in a recess, between the rear seat back and the extreme end of the body, which is normally closed by a lid. The radiator is narrow, but very high, so that a horizontal line can be



A variety of German automobile bodies, mainly of the sporting type





Figs. 6 and 7—Interiors of two German open bodies

run along the top edge of the body from the radiator to the rear end, forming a sharp edge and separating the two colors. The body part lying above this line or edge is painted in black or a dark color, the same as the fenders, while the sides of the body are painted a light color.

Sporting bodies also have been influenced to a certain extent by the new development in German body design. In Fig. 2 is shown a smart sporting four-seater built by Neuss of Berlin. The V-shaped windshield is here omitted; the fenders have straight lines and below the running board there is a long shallow box for carrying tools, spares, etc. The top does not disappear in the body, but rests upon the rear end of the body and is covered by a buttoned leather envelope. As this envelope is black, the same as the upper part of the body, and does not project above the body walls, the top looks very much like the so-called concealed top, but is lighter and cheaper.

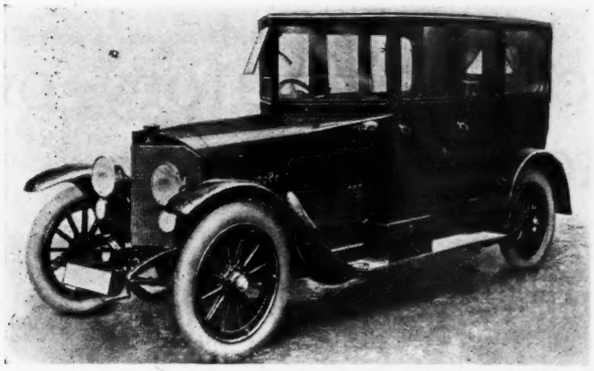
Fig. 3 represents a torpedo body built of natural wood by Kruck of Frankfort. It shows lines similar to those of Fig. 2, but the top is really concealed in the rear part of the body.

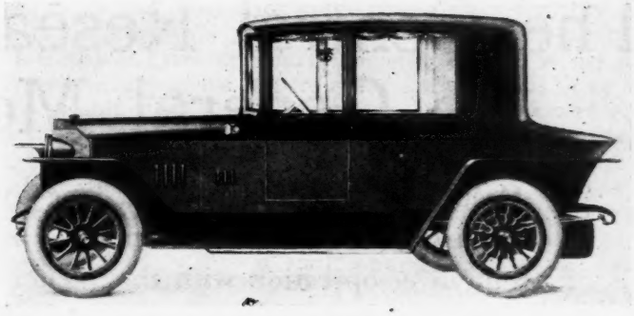
The conventional roadster and runabout are scarcely seen in Germany; indeed the appearance of most of the two-seaters does not differ materially from that of four seaters, and only with the top up can the two types be clearly distinguished. Fig. 4 shows a fine example of a German two-seater, built by Szabo & Wechselmann; it embodies all the characteristics of the four seaters—V-shaped radiator and windshield, horizontal sharp edge, concealed top, etc., the fenders have graceful lines, while in the rear deck there is a dinky seat and storage space for baggage, spare tires, tools, etc.

Fig. 5 shows another touring body, built by Szabo & Wechselmann, that combines all the distinctive German features, but also embodies unusual lines, the body side walls being concaved, producing an unusual, but attractive appearance.

An open six-seater by Voll & Huhrbeck of Charlottenburg, is shown in Fig. 6. The top is concealed in the rear end of the body, the recess for it being covered by large waterproof lids. The sharp edge of the two body sides end in a point at the rear, a feature often found in German cars. The rear seats are real club chairs with arm rests, etc.; the seats proper can be pulled out at will, so that during long runs the passengers can change their position. The two folding seats are of the usual construction, but the V-type windshield is built in three parts with metal frame.

Figs. 8 and 9—Interiors of two closed bodies





Figs. 10 and 11—Conservative and radical types of German closed bodies

Fig. 7 shows a three-quarter rear view of a four-seater which in outside appearance resembles the body of Fig. 6. The hood can be concealed in the rear pointed part, if so ordered by the customer, or is carried in the form of a small parcel and put up in case of bad weather. The V-shaped windshield is one bent piece of glass without metal frame, very light and rakish looking; the fenders also are of V-section, to harmonize with the radiator, windshield, etc. All tops have detachable side curtains with celluloid windows.

The transition from open to closed bodies is formed by bodies with detachable limousine top. Fig. 8 shows an interior view of such a Kruck body with limousine top in place for winter use. The limousine top is very light and can be put on or taken off within a few minutes by two men. When this top is removed it is replaced by a box containing a complete summer top, and then the open car cannot be distinguished from an ordinary touring car.

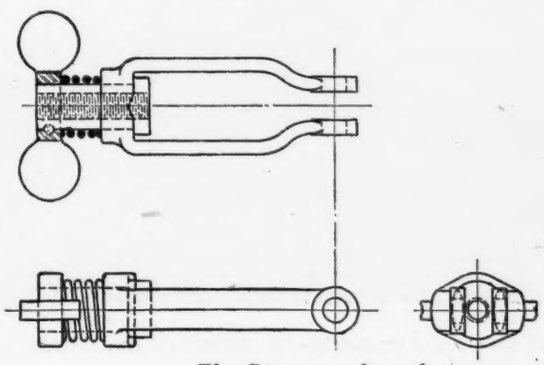
The view of the interior shows the characteristic German design, i. e., divided rear seats with central arm rest and foot rests. The detachable top is built entirely of natural-finished wood in order to prevent damage by moths. Of course it must be very carefully constructed, otherwise it would warp during the summer and not fit in winter. Landaulets are built in the conventional manner but are seldom used. Closed bodies are always built with inside drive; Fig. 10 shows a six seater limousine built by Neuss; the V-shaped radiator harmonizes with the V-shaped windshield and the top is finished in black and contrasts with a dark green body. At the driver's side the windshield is divided and can be opened at will; the front windows can be let down. An interior view of this limousine is seen in Fig. 9. The rear seats, as well as the auxiliary seats have arm rests at both sides. All limousines have doors on both sides at the rear seats and a door at the left side of the driver's seat.

Town cars or coupés are built with or without inside drive; Fig. 11 shows a coupé with inside drive built by Daimler. A dark horizontal stripe runs along the side at the height of the arm rest. The body has a compartment for spare tires, tools, etc. under the rear deck. There is only one door, at the left side. The large windows and the graceful arrangements of the side curtains gives the vehicle an attractive appearance.

An Improved Yoke End

WITH the ordinary yoked rod ends used in brake connections it is not as easy a matter to make an adjustment of the brakes as may seem to be the case. First the cotter pin has to be removed from the pin of the yoke end, then the yoke pin itself must be removed, the yoke end rotated one or more half turns on the end of the rod, the yoke pin replaced and the cotter pin reinserted. With a view to facilitating this operation the Gemmer yoke end, illustrated herewith, has been brought out by the M. J. Ford Mfg. Co. An intermediate piece between the yoke end proper and the rod is provided with ears or finger pieces so that it can be readily turned without the use of tools. This intermediate piece is in the form of a threaded collar which turns comparatively freely in the hub of the yoke proper, but the tendency of vibration to work it out of adjustment is prevented by providing one head with a V-shaped projection which engages with a corresponding notch in the hub of the yoke under the pressure of a coiled spring.

This adjustable yoke end takes the place of the adjustable yoke and turnbuckle. It is claimed to be easier to assemble, to adjust either by hand or wrench and to be less expensive than a separate yoke end and turnbuckle.



The Gemmer yoke end

THE Merchant Venturers' Technical College, which provides the Faculty of Engineering of the University of Bristol, and maintains a separate Department of Automobile Engineering, is just completing the re-equipment of the automobile laboratory. Several firms, recognizing the value of such a department devoted to the study of the problems of the industry and to the training of automobile engineers, have presented valuable specimens of engines and equipment to the college from time to time. The latest gift, presented by Douglas Motors, Ltd., is a standard 2¾ twin air-cooled engine. The same company has also promised one of its new O. H. V. engines immediately they are in production. The engine will be used both for demonstration and research work, with results, it is hoped, beneficial to the makers, students and the motor trade generally.

The Central Research Laboratory of the General Motors Company

Occupies a building 1000 ft. long by 270 ft. wide in Moraine City, a suburb of Dayton, and is operated as an independent unit of the G. M. C. but in co-operation with the various automobile and parts plants of the company, under the direction of C. F. Kettering and a staff of specialists.

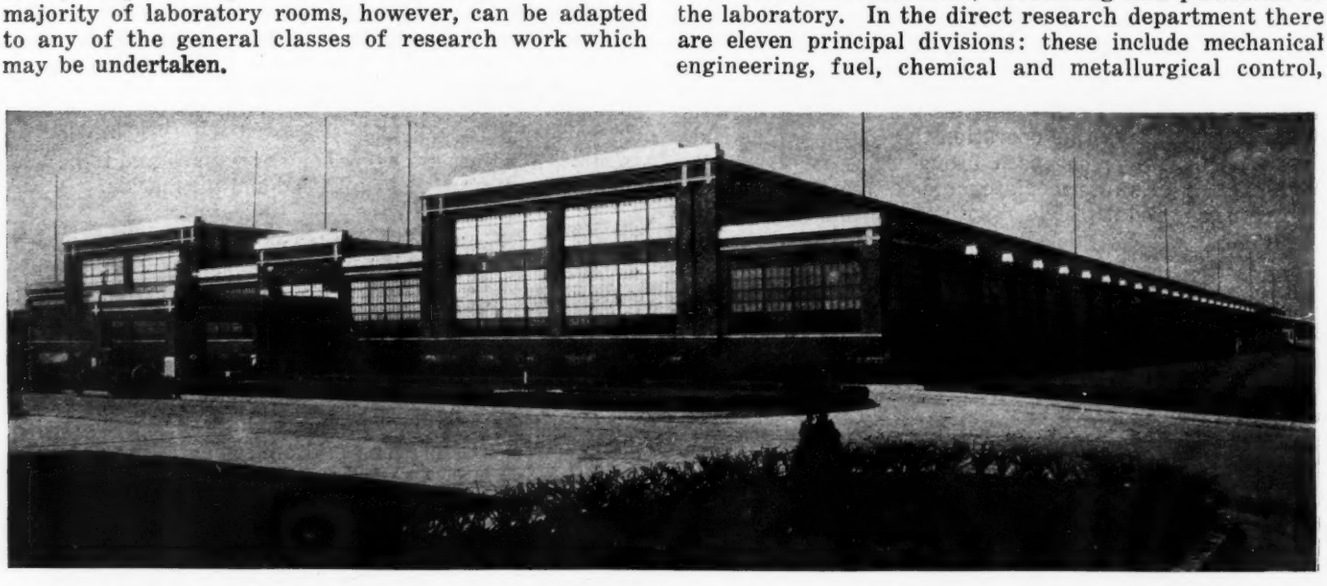
By J. Edward Schipper

REALIZING the advantages of bringing under one roof a number of branches of research activity, the General Motors Company is concentrating a great proportion of its activities along this line at the laboratory at Moraine City, Ohio. The research unit is a separate corporation known as the General Motors Research Corp., having its own officers and directorate, and operates as an independent unit, although co-operating with the different automobile and parts manufacturers in the General Motors group.

The organization occupies a building 1000 ft. long by 270 ft. wide. It has been possible to divide this structure into a number of laboratories, each equipped with all of the necessary devices for carrying on research work in the different departments into which this activity is being extended. At the same time, these small laboratories, which are 20 by 30 ft. in dimension, are elastic enough in their arrangements so that as soon as a research job is completed another one of entirely different characteristics can be started. The laboratories are all equipped with compressed air lines, vacuum lines, necessary electrical equipment and are provided with electric current of different characteristics, and are, furthermore, excellently lighted. Some of the research rooms are equipped with devices which render them permanently adapted to specific lines of research work. The majority of laboratory rooms, however, can be adapted to any of the general classes of research work which may be undertaken.

This centralization of the laboratory idea into one building has naturally led to a gathering together of specialists and experts in the various lines, giving an opportunity of so co-ordinating the work of these various lines that the work of the different divisions of the laboratory can be made to dovetail into a general scheme of research which renders it of highly practical value. In fact, a strict point of practicability is made in all of the laboratory work which is being undertaken. All of the development and research points to some commercial end, which, although it may be in the remote future, is, nevertheless, some day going to find its way on the market as a practical product. In addition to these activities which have to do with future products, there is also a great amount of routine work at the laboratory having to do with current problems in the General Motors plant.

The research corporation is fortunate in having at its head C. F. Kettering, whose personal research work has made him sufficiently acquainted with the different lines of activities going on at the laboratory to have an intimate and detailed knowledge of practically all the work under way. In order to allow the division heads who are in the actual research work to be absolutely free to devote all of their energies to the research part of the business, the control division is entirely separate and handles the business, accounting and personnel of the laboratory. In the direct research department there are eleven principal divisions: these include mechanical engineering, fuel, chemical and metallurgical control,



Exterior of the laboratory building of the General Motors Research Corporation at Moraine City, Ohio, which is just outside of Dayton

which has to do with current manufacturing processes, and chemical and metallurgical research, which has to do with future methods. There are also included divisions for electrical engineering, dynamics, refrigeration, farm engineering, experimental production, which has to do with reducing design to production, by means of model-building, etc.; semi-works engineering, which has to do with the development of manufacturing methods, such as special machines and tools, and instrumentation, which includes experimental and development work on matters requiring accurate dimensions, such as speedometer designs, etc.

These activities are carried on in forty-four laboratory rooms, and in addition there are machine shops in some of the laboratory departments where they are necessary to carry on the work. The laboratory is equipped with its own heat-treating plant, foundry and pattern shop, and carries on hand a stock of the different necessary steels for this work. With this equipment, and by the selection of men who are all highly practical in their line and who are willing to get right into the work themselves, some very noteworthy results should be accomplished. In order that the work is continually being co-ordinated and checked up at all times, frequent conferences are held. As a matter of routine, there is a conference every Saturday afternoon presided over by C. F. Kettering. At these Saturday afternoon conferences reports are made by the different divisions as to the status of the work under way. Problems are assigned to the divisions, and by a system of progress reports the advancement of the work is kept in view. With the wide range of activity carried on by the eleven principal divisions, which have their sub-divisions, two or three hundred problems may be receiving attention from the laboratory at a time.

The laboratory staff and equipment are at the disposal of all of the General Motors plants, and there is a growing tendency for the chief engineers and their assistants from all of the General Motors plants to get together at the laboratory every few months for discussion. A library is provided with an up-to-date supply of technical literature and it is large enough to act as a very advantageous lecture room. In addition, there is an exhibit room into which may be brought various products of the laboratory for display at the conferences.

The laboratory is not as yet a year old, the research corporation having been started in July, 1920. Consequently, the activities of the laboratory are not as yet by any means up to their full development. There has, however, been sufficient work going through to indicate that this plan is going to work out in a highly successful manner, and a great many advantages are going to result from the ability of the various plants in the General Motors group to place in the hands of a highly selected staff of experts, not only their current problems, but also those of future marketable devices.

The matter of fuel alone is sufficient to occupy a considerable share of attention. The fuel division at the laboratory is equipped with complete distillation apparatus for producing any of the possible fuels which may come into future use. The development of fuel "dope," which promises to be one of the matters of prime importance to the automotive industry in future years, is before this division at the present time.

With a mechanical engineering division under the same roof as the fuel division, after a fuel has been developed the engine design necessary for the utilization of the fuel can be handled, perhaps jointly by the mechanical division and the fuel division. By allowing the various divisions to co-operate, even though their activities demand widely divergent classes of knowledge, the solution of a problem involving ramifications which lead it into many special fields is far more feasible than it would be with a single-purpose laboratory.

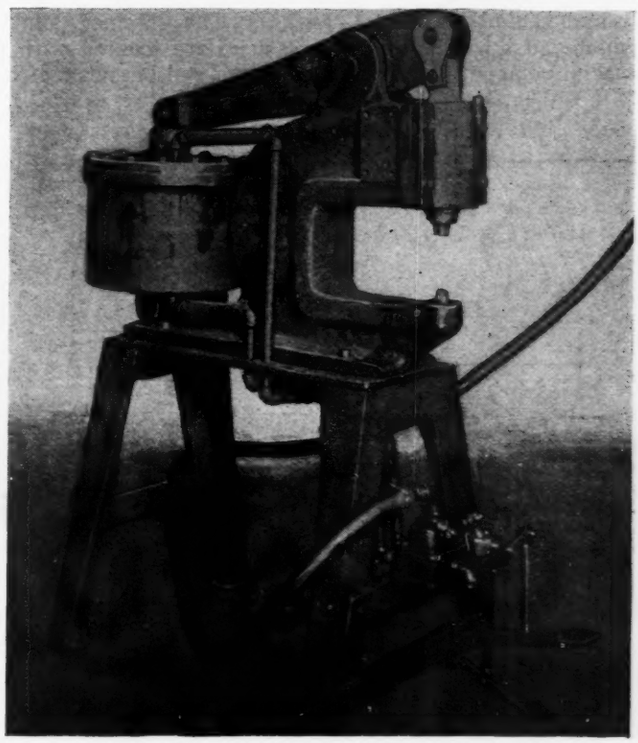
Production Short Cut in Frame Fabrication

A PUNCH and riveter for the fabrication of automobile frames is manufactured by the Baird Pneumatic Tool Co. It is operated by compressed air and does its work best with an air pressure of 100 lb.

With this tool the services of two men are required for maximum production, one to set up the frame and the other to guide it and operate the pedal of the riveter. The work is brought to the machine, which is stationary.

We are informed that during a test in an automobile assembly plant two men with the Baird riveter did in the same time the same amount of work previously done by four men. Two men with the Baird tool riveted 150 automobile frames in an eight-hour day, while previously four men with pneumatic hand hammers could rivet only 75 frames in the same length of time. Without special effort, eight rivets were set in thirty seconds.

By the use of this machine the rivet is headed with a single stroke or thrust, and there is said to be no vibration attending to loosen joints already made. Each rivet is uniformly headed and completely fills the rivet hole. A pressure of approximately 70,000 lb. is exerted on the rivet dies.



Baird pneumatic punch and riveter for automobile frames

COMMENTING on Sir Henry Fowler's presidential address before the Institution of Automobile Engineers, *The Engineer* says "he was in high gear all the way through it and took the hills and a few distinctly sharp corners at the same amazing velocity. If after dinner speeches were taxed on their horse power, we stand aghast at Sir Henry's R. A. C. rating."

Government Research in Road Construction

Part II

A continuation of the article dealing with the extensive investigation being conducted by the U. S. Bureau of Public Roads of factors entering into the strength and durability of different types of roads.

By P. M. Heldt

A SPECIAL investigation was conducted to determine how heavy wheel loads are transmitted to the subgrade. Several years ago a small pressure cell was developed by the Bureau of Public Roads. This was first used on the Camp Humphrey's concrete road to determine the maximum soil pressure under the rear wheels of a Class B army truck, which carry a weight of 8500 lb. each. Recently similar tests were made with a 5-ton, 6-wheel truck, in which the load of the truck is distributed over four instead of two wheels. Sectional and plan views of the diaphragm cell for determining soil pressure are shown in Fig. 12. The cell consists of three cast iron disks A, B, C, and a malleable iron ring D, A and B and D and C being secured together respectively by means of machine screws. The top is covered with a brass diaphragm 0.002 in. thick, pressed over the sides and cemented, to the sides only, with asphaltic cement. The brass top is protected by a covering of cheese cloth cemented to the top and sides with a blown oil asphalt. A brass diaphragm 0.002 in. thick is clamped between A and B and between C and D. The clamped joints, which must withstand air pressure, are treated with a special compound of rubber, vaseline and beeswax. The block E is of steel and is insulated from C, on which it is supported by a layer of Bakelite cement No. 5. From the block E extends a No. 16 copper wire with triple braid weather-proof insulation, through a ⅛-in. galvanized iron pipe. Evidently when Block E is in metallic contact with disk B an electric circuit is closed through the ground. The soil pressure tends to close this circuit, and by admitting compressed air through the iron pipe until the circuit is broken and then measuring the air pressure, the soil pressure per square inch is directly determined.

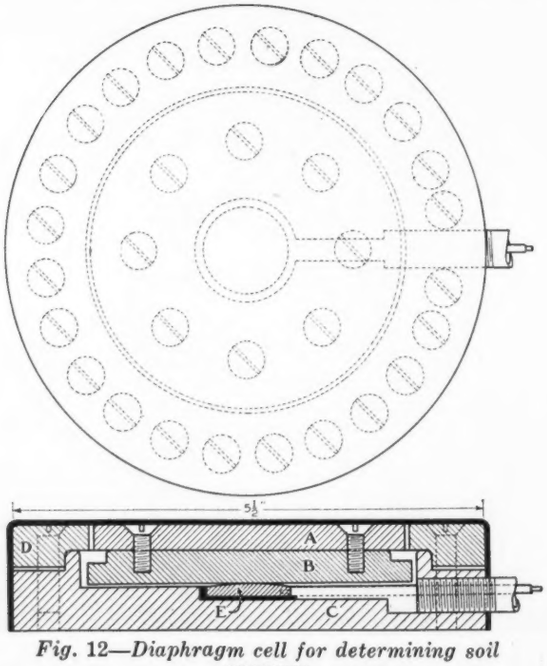


Fig. 12—Diaphragm cell for determining soil pressure

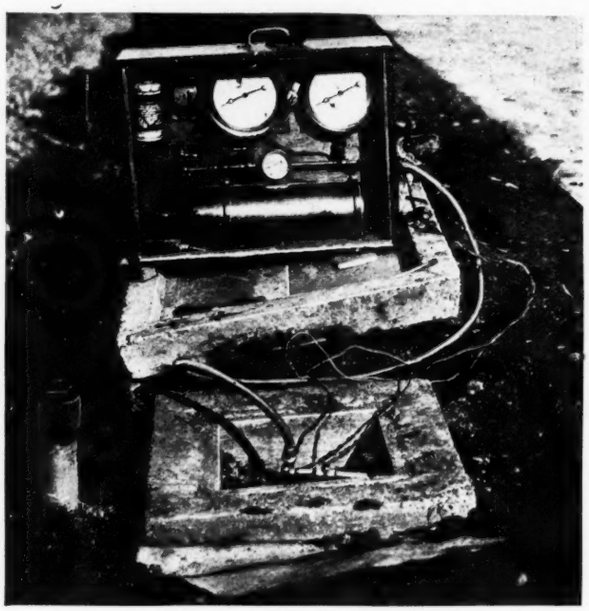


Fig. 13—Apparatus for reading pressure on soil pressure cells

Distribution of Subgrade Pressure

Fig. 13 shows the measuring box and connection for reading the soil pressure cell. In Fig. 14 a cross section of the Camp Humphrey's Road is shown, the location of the four cells used in making this test being indicated. This road had an 8-in. concrete slab of great strength, which naturally has the effect of distributing the concentrated wheel load over an extended area of subgrade. In spite of this fact, the maximum subgrade pressure under the wheel was greater than certain kinds of subgrades will support when water soaked. It is perfectly

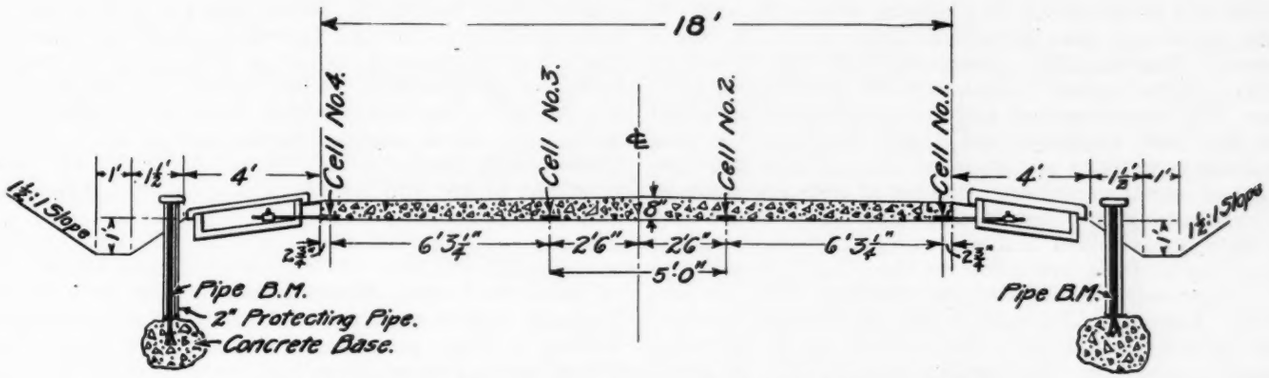


Fig 14—Section of Camp Humphreys road showing location of cells

obvious that roads, if they are to stand up, must be so designed that the maximum subgrade pressure will not exceed the minimum subgrade bearing capacity. Once the subgrade bearing capacity under all conditions is known, it is then a comparatively simple matter to determine the proper type and thickness of road surface which will support the traffic to be expected. A complete series of tests on subgrade bearing pressures with rigid and non-rigid road slabs is now being conducted.

In Fig. 15 are plotted the pressures obtained from the different cells when at different distances in the line of travel from the center point of contact of the wheel on the ground. The upper curves show the distribution of pressure when the truck travels in the center of the road and the lower curves when it travels to one side. These tests were made with a Class B army truck carrying 8500 lb. on one rear wheel and 2500 lb. on one front wheel. Comparative tests were made with the Goodyear six-wheeled truck, in which 9480 lb. were carried on two rear wheels, and it will be noticed that the maximum subgrade pressure is only about one-third as great, although the load carried is greater. This shows the advantage of distributing the load, or in other words, of not carrying too much load on one wheel.

A series of tests to determine the causes of subgrade failure is now being carried through. In certain parts of the country where there is heavy traffic, road failures have been directly traced to poor subgrades. It has been found that similar road surfaces under similar traffic conditions will stand up in some parts of the country but not in others, and the reason must be looked for in differences of subgrade. The exact qualities of soil which make for good subgrades are not definitely known at the present, and research work on the subject has been started. Almost 100 samples of subgrade soil have been selected from different parts of the country, for tests at the laboratories of the Bureau of Public Highways. Some of these samples are from parts where failure took place, and others from parts of the same roads that withstood the traffic.

Investigation of Subgrade Soils

Soil samples of a volume of 1 cu. ft. were sent to the laboratory and tests were made to determine the percentages of clay and silt, the colloidal properties, mechanical analysis, slaking value, cementing value, bearing value, specific gravity, capillary properties, moisture equivalent and miscellaneous properties such as volume changes with moisture, volume changes with freezing, and compressive strength. At the same time that the samples were taken, notes were made on the drainage system and the topography of the vicinity, and borings were made to a depth of 5 ft. to investigate the subsoil for the presence of seepage layers on impervious strata. These borings often throw light on the reason for excessive water content. Notes were also taken on construction features of the road and on the character of the traffic over it.

Results so far obtained have made it quite clear why roads stand up on some kinds of soil and fail on others. It has become quite apparent that the bearing value test is the most important of all those enumerated above. Roads must support their traffic under a wide variety of conditions. Sometimes the subsoil is completely saturated with moisture, while at other times it is perfectly dry. Frost occasionally will expand the subsoil when it is thoroughly saturated, and again the subsoil may be thoroughly compacted. In the test it is attempted to simulate all road conditions. The method of making this test is as follows:

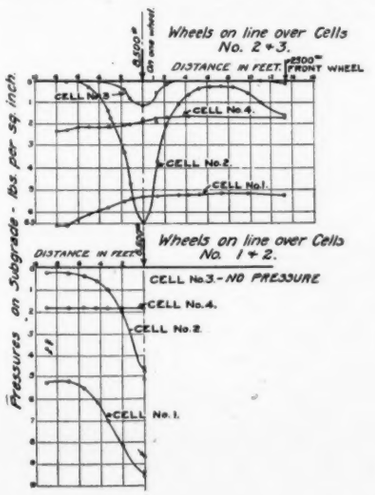


Fig. 15—Distribution of subgrade pressure under wheels of Class B Army truck

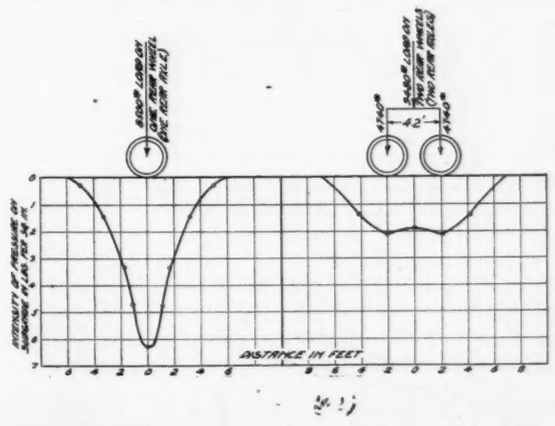


Fig. 16—Distribution of pressure in subgrade under 8-in. concrete slab with two and four rear truck wheels respectively

The soil is broken up in a mortar with a rubber-covered pestle and then is passed through a ¼-in. mesh screen. The material passing through this screen is pulverized by rubber rollers, without grinding it, however. The pulverized soil and the coarser material sifted out are then combined again and thoroughly mixed. Bearing value tests are made on the soil with four degrees of moisture content. One set of tests are made on soil containing only just enough moisture to enable it to be thoroughly mixed and placed in a small mold; another set of tests are made on the saturated soil and two other sets on soil with intermediate moisture contents. The saturation point is that percentage of moisture which the soil will take up by capillarity when loosely compacted. The bearing capacity of a subgrade also depends on the initial pressure. In the tests, initial pressures of 10, 30, 50 and 100 lb. per sq. inch are used. Each sample is therefore tested with four different moisture contents and under four different initial pressures.

After the sample is prepared as described, it is mixed with a small amount of water, kneaded with the hands protected with rubber gloves, and placed in a vertical cast iron cylinder of 6 in. diameter and 6 in. height. A plunger is then placed in the cylinder on top of the soil and the soil is compressed in a testing machine under a definite pressure for a period of 5 min. Then the plunger is removed and a circular bearing block is placed on top of the soil and pressure applied at the lowest speed of the testing machine. Readings are taken simultaneously of the pressure applied and of the penetration of the plunger, the latter being read off on an Ames dial gage, which reads to 1/1000 of an in. Between tests at different initial compressions the soil is removed from the cylinder and replaced, and when the tests at all four compressions have been completed, water is added and the tests with a new increased water content are begun. This artificial preparation of the soil is very similar in its effects to natural changes in soil conditions. Fig. 17 shows the results of the test on one type of soil. The enormous difference between the bearing value of a saturated and practically dry soil, when under 100 lb. per sq. in. initial pressure, is brought out very strikingly. In the saturated condition this soil has a bearing value of only about 2 lb. per sq. in, whereas in the dry condition the bearing value exceeds 150 lb. per sq. in. The soil to which these tests refer is an adobe soil, which absorbs 42 per cent of moisture and shows about the lowest bearing value in the saturated condition of any soil tested. The road from which this soil was taken failed badly.

A sand clay mixture made up of 75 per cent of coarse sand and 25 per cent of clay absorbed only 18 per cent of water by weight of the dry sample and showed considerably higher bearing value. Soils of this character, having a large percentage of coarse material, show higher bearing values when highly compacted than when loosely compacted even when the soil is saturated.

In the tests of the Class B truck on the Camp Humphrey's Road above referred to, it was found that the soil pressure under the 8-in. concrete road slab figured out to 6.5 lb. per sq. in. By comparing this value with the 2 lb. per sq. in. minimum bearing value of the adobe soil in the saturated condition, it will be seen that difficulties must be encountered in building roads for heavy motor traffic in some sections of the country. But even adobe soil will support heavy pressure when reasonably dry, which emphasizes the importance of proper drainage. This is further confirmed by the fact that city pavements of small depth stand up so well under the heaviest kind of traffic, the only explanation being that the subsoil here is well drained and never becomes saturated. Fine grained and very plastic soils when saturated are apt to give considerable trouble, while coarse

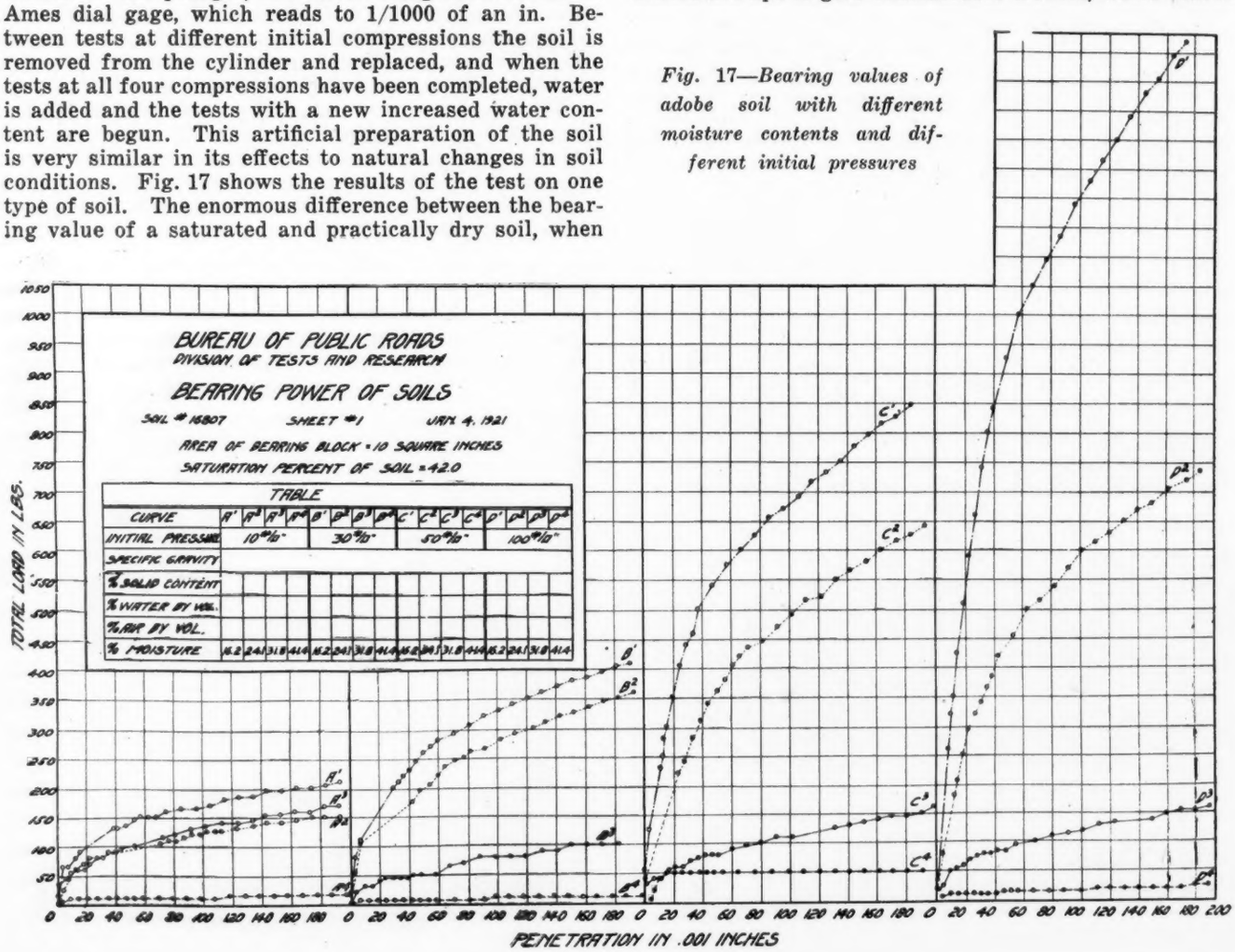


Fig. 17—Bearing values of adobe soil with different moisture contents and different initial pressures

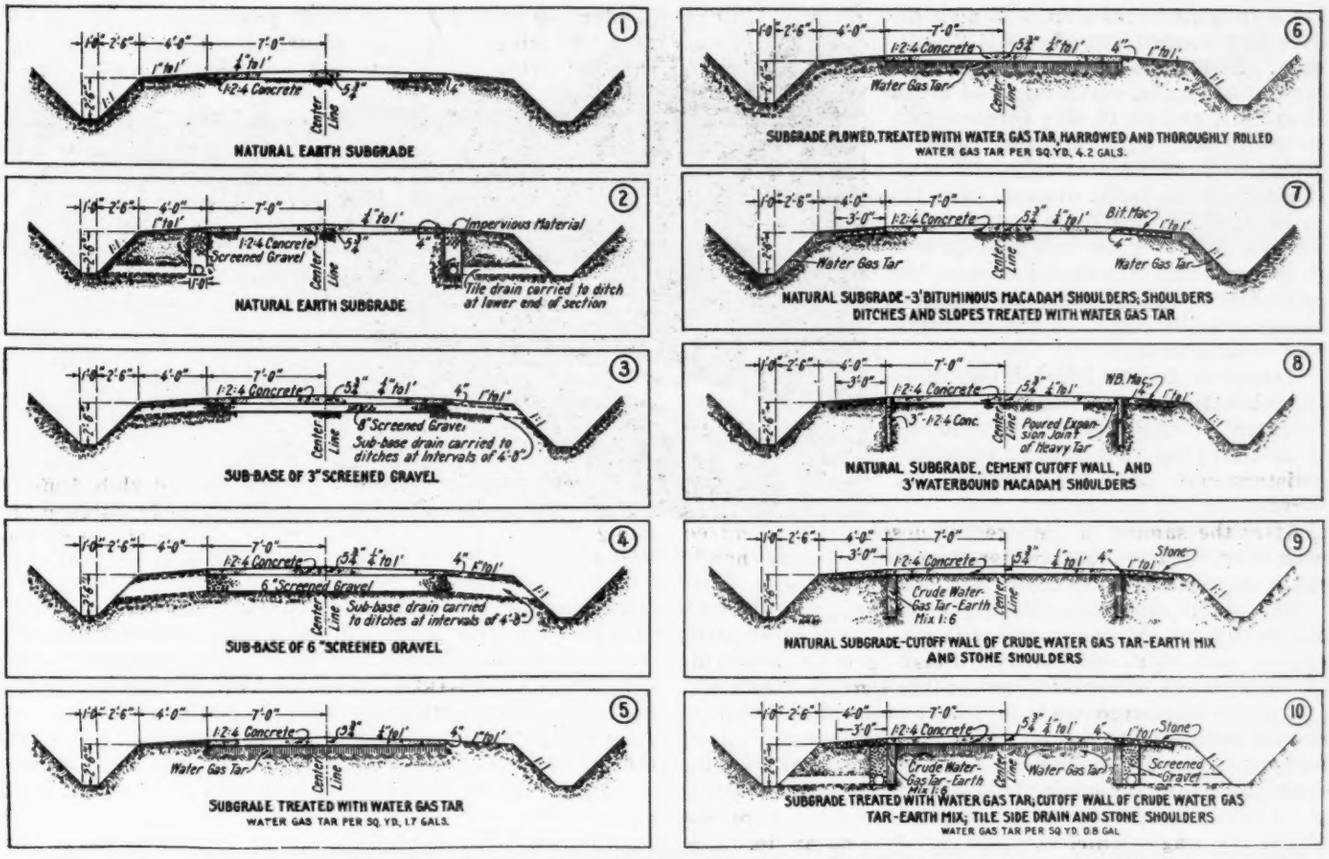

1
NATURAL EARTH SUBGRADE
2
NATURAL EARTH SUBGRADE
Impervious Material
Tile drain carried to ditch at lower end of section
3
SUB-BASE OF 3" SCREENED GRAVEL
4
SUB-BASE OF 6 "SCREENED GRAVEL
5
SUBGRADE TREATED WITH WATER GAS TAR
WATER GAS TAR PER SQ. YD. 1.7 GALS.
6
SUBGRADE PLOWED, TREATED WITH WATER GAS TAR, HARROWED AND THOROUGHLY ROLLED
WATER GAS TAR PER SQ. YD. 4.2 GALS.
7
NATURAL SUBGRADE - 3' BITUMINOUS MACADAM SHOULDERS, SHOULDERS DITCHES AND SLOPES TREATED WITH WATER GAS TAR
8
NATURAL SUBGRADE, CEMENT CUTOFF WALL, AND 3' WATERBOUND MACADAM SHOULDERS
9
NATURAL SUBGRADE - CUTOFF WALL OF CRUDE WATER GAS TAR-EARTH MIX AND STONE SHOULDERS
10
SUBGRADE TREATED WITH WATER GAS TAR; CUTOFF WALL OF CRUDE WATER GAS TAR-EARTH MIX; TILE SIDE DRAIN AND STONE SHOULDERS
WATER GAS TAR PER SQ YD. 0.8 GAL

Fig. 18—Road sections showing different drainage schemes

grained and more porous soils are free from such trouble.

An attempt will be made by the Bureau of Public Roads to grade all soils with respect to their bearing value. Subgrade failures have occurred in many parts of the country where drainage was employed, but in view of the fact that in the cities very heavy traffic is successfully supported on light section pavements, the conclusion is arrived at that the drainage of our roads in many cases is not very effective during the wet season.

The next step in the Bureau of Public Roads investigation therefore was a series of tests on road drainage which was carried out at Arlington Farms, Va. The ideas underlying these tests are illustrated in Fig. 18.

Fig. 19—General view of construction for road drainage tests

Subgrade Drainage

The idea occurred to the officials in charge of the tests to try whether it was not possible to exclude water from the subgrade by the use of water proofing materials. This, of course, involves principles diametrically opposite to those on which the present drainage system is based, which only serves to carry away the water after it has saturated the subgrade and rendered it extremely soft. At 1 (Fig. 18) is shown an ordinary concrete pavement on natural earth subgrade with drainage ditches 2½ ft. deep on both sides. At 2 this construction is varied by providing at both edges of the concrete pavement screened gravel walls with a covering of impervious material, the walls forming a sort of blind ditches of the same depth as the drainage ditches with which they communicate through tiles. At 3 the concrete slab is laid on a 3 in. screened gravel subbase from which tiles extend to the ditches every 4 ft. 8 in. At 4 the thickness of the subbase is increased to 6 in. At 5 the subgrade of natural earth is treated with water gas tar, 1.7 gal. to the square yard. At 6 more of this water gas tar is used, 4.2 gal. to the sq. yd. The subgrade is plowed, treated with the water gas tar, harrowed and thoroughly rolled. At 7 the subgrade is of natural earth but on each side of the concrete there is a 3 ft. bituminous macadam shoulder, and shoulders, ditches and slopes are treated with water gas tar. At 8 there

are 3 ft. water bound macadam shoulders and cement cut-off walls 2½ ft. deep. At 9 there are crude water gas tar cut-off walls, earth mix and stone shoulders, and at 10 this construction is combined with screened gravel drains outside the cut-off walls with tile connection to the ditches. The results of these drainage experiments were to be observed this spring, and if they proved successful it was the intention to repeat them on a larger scale with the aid of the state highway departments.

According to the latest information available, the section with the gravel sublayer promised the most success. It is concluded that such a layer not only serves to keep the subgrade dry by aeration but also helps to distribute the wheel pressure over the soft subsoil. Fig. 19 is a general view of the subgrade drainage experiments.

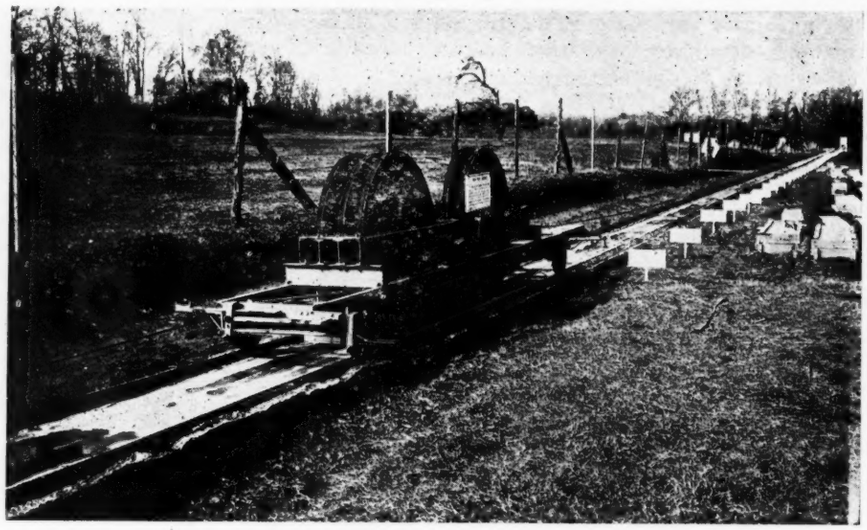


Fig. 20—General view of construction for accelerated wear tests

To quickly determine the wear-resisting qualities of different kinds of road pavement, an experimental road section was built, 400 ft. long and 2 ft. wide, made up of sections of different types of pavement. Concrete side walls were constructed on both sides of the experimental sections the whole length. The pavements were laid on a sub-foundation of compacted cinders 18 in. deep and the subgrade below this was tile-drained throughout its whole length. All wearing sections except those of concrete were laid on a 2-in. concrete base of 1:3:6 mixture. The concrete wearing sections were made 6 in. deep. The wearing machine (Fig. 20) consists of 5 cast iron wheels weighing 1000 lb. each and having a face width of 2 in. Three of these wheels are arranged side by side, spaced 3 in. apart, and the other two are to

(*Continued on page* 921)

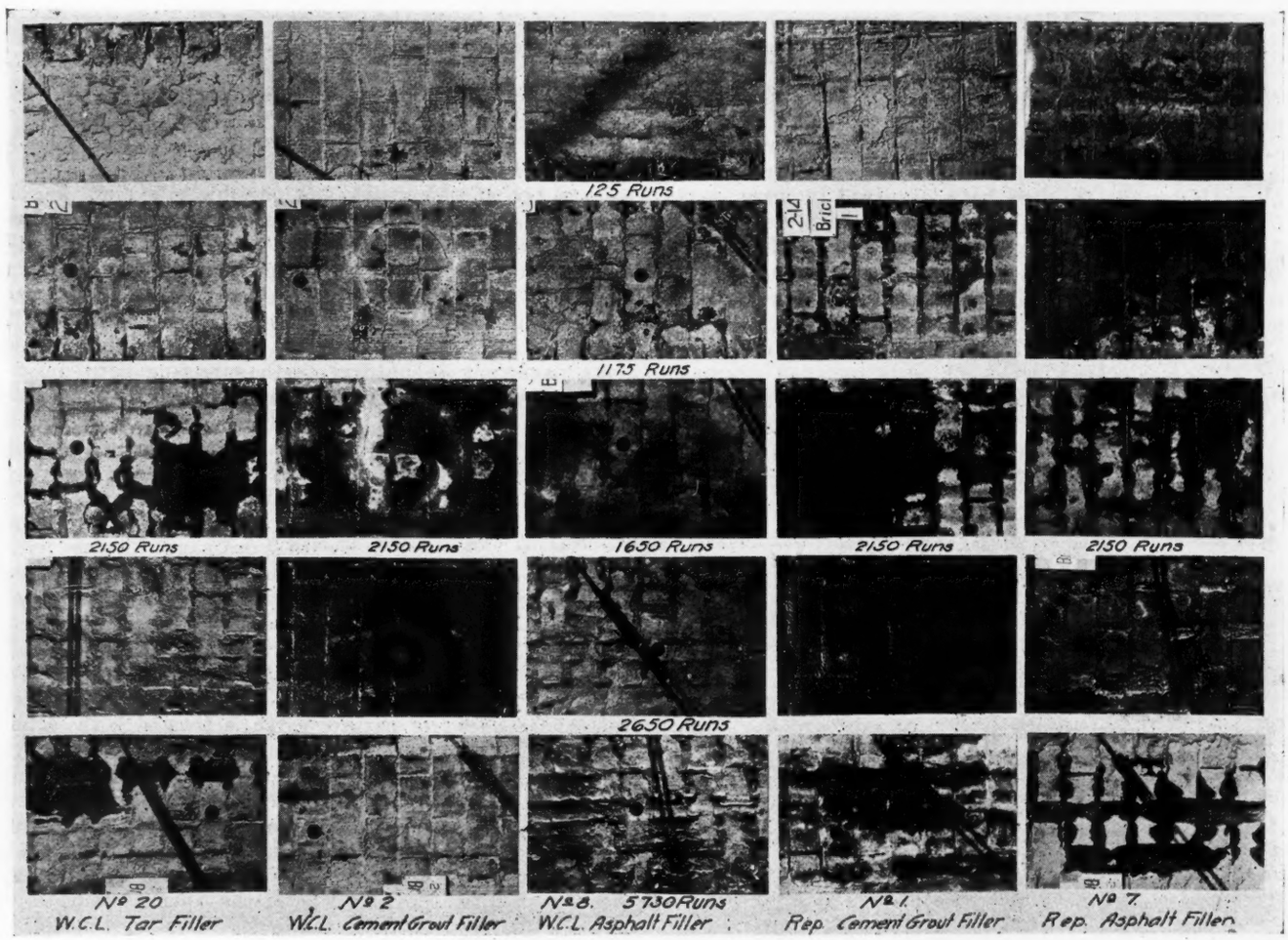


Fig. 21—Photographs of sections in different stages of wear

Hub, Wheel and Tire Standardization

Editor AUTOMOTIVE INDUSTRIES:

(1) The very interesting letter of John Younger in the March 10 issue of AUTOMOTIVE INDUSTRIES brings out many points in connection with hub standardization and standardization generally and shows the weakness and fallacy of the S. A. E. in entering into the design in detail rather than laying out the broad basic points to be covered in axle standardization.

(2) In the third paragraph he seems to have struck the key to the whole thing where he says: "There is a lurking suspicion in the back of my mind that such a standardization may eventually lead to loss of individuality." If the detail of design is furnished, the axle makers and designers, as intimated, become in fact mere rubber stamps, and all produce unified axles, all having the same merits or demerits, and all presumably producing at the same price, or under an association of prices, absolutely against the laws of the country, they become in effect *one* axle manufacturing corporation.

(3) All progress and improvements cease, and all individual incentive is lost. However advantageous a unified design of construction may be temporarily, as in the case of war, to bring this about as a permanency, is quite another matter, especially in an industry as large and varied as the automobile and truck business, and would in effect result in a complete centralization and monopolization.

(4) It is not the function of the S. A. E. to go into the detail design or the manufacturing business, and especially to present a design of proposed axle standardization for one type of bearing.

(5) The merits and advantages of the ball bearing are well recognized the world over, and especially it must not be overlooked that the ball bearing is the recognized standard, and practically the only completely standardized bearing, in every civilized country of the world outside the U. S. A.

(6) Therefore the car or truck maker seeking a world-wide market must determine for himself the advantages or desirability of adopting one or the other types of bearings. The ball bearings are universally standardized as regards interchangeability of size the world over, and it would therefore seem to be up to the roller bearing makers and all makers of other types of bearings to provide for an interchangeability of their bearings.

(7) In my view the S. A. E. should never recommend any individual maker's details of construction and dimensions. Instead it should collect and distribute data in regard to various recognized constructions to enable the car and truck maker and assemblers to have in a convenient form complete information for reference. The suggestion of Mr. Younger to gather the engineering practices as Professor Unwin did in his text book is an excellent one. The S.A.E. should co-operate with the makers in bringing this about and bring all this information into their data sheets. Undoubtedly the makers would appreciate this and would willingly co-operate and even reimburse the S. A. E. for the actual printing and distribution of such data sheets as a part of their publicity. This has been done in the past by the makers, but quite independently of the S. A. E. in regard to the arrangement. Of course the expense of any general data sheets should be continued and borne by the Society.

(8) Mr. Younger's contention is quite correct that any step tending toward a leveling of the design is to be deplored and lack of individuality is the result, as instanced in the experience of his English friend that to him all American cars look alike. This criticism is true, for the methods of assembling American cars all tend this way, as in reality many of the elements are alike, and, as Mr. Younger puts it, all the front axles are alike, and when in addition all radiators and front ends are also made alike (for apparently many so-called designers are only copyists), the reason for the criticism becomes apparent.

(9) The final result, therefore, of such a standardization would be the concentration and the manufacture of all passenger cars in one large corporation, for at the most it is only possible to make four different sizes of passenger cars to cover the entire field, and this might easily be undertaken by one such corporation, or the field extended to cover all trucks as well, as this would only take ten sizes, and by this means we get *absolute standardization* and *absolute monopolization.*

(10) Unless we have arrived at perfection to standardize all details at the present time would mean to standardize *all defects.* Would you suggest standardizing the front axle construction embodying the unmechanical and unscientific and heavy offset steering knuckle, which is perhaps the cause of more serious accidents than any one element of automobile or truck? The logical steering knuckle is the central or castor steering knuckle, having the steering pin in the center of the plane of rotation of the wheel, and this knuckle properly designed can be made much lighter and stronger and cheaper than the present "offset" steering knuckles and have only *half the number of parts.* It reduces to a minimum all strains, is much easier steering, especially in the larger sizes, and having a true "castor" effect, all machines *tend to run straight without steering,* and only need to be pulled out of the straight line and when left alone automatically revert again to the same position. This results in a simpler and cheaper steering post mechanism and absolute irreversibility becomes of secondary importance, as the steering wheel is not knocked out of the hand by every slight road obstruction. By this means also the front wheels can be made vertical instead of inclined, bringing the wear central upon the tire, the same as for the rear wheels. This inclination of the front wheel is the cause of many accidents resulting in crushed wheels in turning corners and oftentimes causing the complete machine to "turn turtle."

(11) Similarly to standardize the rear axle construction as at present made would be to standardize similar *defects.* As regards the three present types of rear axles, full floating, three-quarter floating and semi-floating, it would be a needless complication to attempt to standardize all three, as there is so little gained or saved in the manufacture of one over the other, and the best only should be recommended and standardized. It has never yet been demonstrated that an overhanging bearing is superior to a cen-

trally supported bearing, and until this has been done or demonstrated there does not seem to be much doubt as to where the superiority is. In fact, it seems to be the same condition as is met with in the front axle and referred to above as to the relative merits of the central steering knuckle or the offset steering knuckle, or in this case the overhung wheel and the centrally supported wheel.

(12) Therefore, as stated above, if it is desired to completely kill all progress, standardize present defects, or if the automobile has reached perfection, *complete standardization* cannot be brought about too soon. At the present time one maker of a so-called standardized car produces half of all the passenger cars made in the U. S. A., and a second maker has only to standardize two or three larger sizes to make the rest. That is assuming that No. 1 and Nos. 2, 3 and 4 standardized cars stay standardized and then all axle makers and special parts makers go out of business.

(13) Now the fact is that there are many parts of the car that can be legitimately standardized, and if the S. A. E. would devote themselves to this field they will be fully occupied and will be of great help to the industry. This is said not as a criticism, for having been one of the original subscribers or founders of the S. A. E. 'way back in 1904, I know something of the history of the Society and appreciate what has been done, and also what there is to do in the future if the S. A. E. is to continue to maintain its position.

(14) The first thing to be done before any axle standardization can be considered is the *standardization of pneumatic tires*, as everything depends upon the size of tire. There has been talk for two or more years of basing these tire diameters (wheel or rolling diameters) on a 24-in. tire seat diameter so as to get interchangeability of rim and also to reduce the number of sizes of tires. If this is what is wanted why not adopt it and then all designers know what the fundamental condition is to be and can proceed. A ballot could be sent out to every member and the result known in thirty days, and the Council of the S. A. E. could, if so decided, make this effective at once. This would in no way affect the present making of other sizes of tires, and it would be years before these old sizes would become completely obsolete.

(15) Pneumatic Tire Specifications.—A general form of specification to cover pneumatic tires is necessary covering sizes, diameters and general dimensions, and it is suggested that these be on the following lines:

The sizes of all *round pneumatic tires* shall be based upon a 24-in. diameter of rim seat, and the diameter of the tire proper shall be based on its outer diameter at its center cross section, and these standardized sizes shall be 3 in., 3½ in., 4 in., 4½ in., 5 in., 6 in., 7 in., 8 in., 9 in., 10 in., 12 in. and 14 in. diameter, and no other sizes shall be recommended or recognized, and all tire details shall be expressed in functions or percentages of the tire diameter and shall be as follows:

Width of tire rim seat	.75	of tire diameter
Width flat tread of tire	.75	of tire diameter
Center of tire	.50	of tire diameter from rim seat
Allowable deflection assumed	.10	of tire diameter
Added depth of tread assumed	.10	of tire diameter
Thickness of tire wall assumed	.10	of tire diameter
Thickness of tube wall assumed	.025	of tire diameter
Producing a cross-section of suspending air column of	.75	of tire diameter
Radius of curve at base of rim seat	.075	of tire diameter or nearest 1/16 in.
Radius of curve at edge of flat tread	.075	of tire diameter or nearest 1/16 in.
Molded outside diameter of tire	2.20	of tire diameter plus 24 in.

In order to make the point of ground contact of the tire "square" with the accepted nomenclature, it is necessary for the depth of added tread and the amount of deflection to be the same. In order to determine the width of the rim seat, which should be the same as the suspending air column, it is similarly necessary to assume a thickness of tire and tube wall.

(16) The making of any special sizes of tires, as say a special 5-in. tire, should be discouraged, and also the adoption of "over size" tires on a smaller rim is similarly discouraged. With a fixed tire seat diameter it should always be possible to interchange two sizes of regular tires on any given size of demountable rim properly standardized or to interchange two sizes of detachable wheels.

(17) **Solid Tires.**—To complete the axle standardization requires also the standardization of solid tires and raises at once the question whether these wheel sizes should not be so standardized as regards diameter to have as nearly as possible the same wheel diameter as the pneumatic, size for size, and it is suggested that these be as follows:

32 x 3	Based on 26-in. rim seat	36 x 7	Based on 30-in. rim seat
32 x 3½	Based on 26-in. rim seat	36 x 8	Based on 30-in. rim seat
32 x 4	Based on 26-in. rim seat	40 x 9	Based on 34-in. rim seat
32 x 4½	Based on 26-in. rim seat	40 x 10	Based on 34-in. rim seat
36 x 5	Based on 30-in. rim seat	40 x 12	Based on 34-in. rim seat
36 x 6	Based on 30-in. rim seat	40 x 14	Based on 34-in. rim seat

(18) As regards the carrying capacities of all solid tires, these are very much overloaded and should be *re-rated*, and they will be legislated off the roads unless some steps are taken in this matter. Already several states have taken steps to limit their capacity, and the S. A. E. rated loads of 1000 lb. per inch of width of tread are absurd. If size for size they were rated the same as pneumatic tires, the loads would be more reasonable, and even this would mean from 400 lb. for the smaller tires to 800 lb. for the larger tires *per inch of width of actual tread.* No state can afford to build roads, to stand such heavy concentrated loads, and no matter how heavily the trucks are taxed, these taxes will be quite inadequate for the damage and to maintain the upkeep of the roads. Unless it is desired to kill the solid tire truck completely this re-rating cannot be done too soon. Perhaps, though, it would not be such a bad idea to advocate all pneumatic tire trucks, before the people demand a heavy truck be taken off the roads on account of their damage, and also as interfering with and crowding off passenger car traffic from the roads and insisting that this heavy traffic revert to the railroads.

(19) In this connection the carrying capacity of dual tires should also be considered, and the fact that two 5-in. tires do not have the capacity of a single 10-in. tire, as the road contact of the two 5-in. tires is 6 in., and the one 10-in. tire 8 in., giving the latter 33 per cent more carrying surface. Further, the width of the two tire base bands is 11¾ in. (assuming they are placed side by side and close up), while the single 10-in. base is only 10⅞ in. Further, on crowned roads practically all the load is carried on the inner tires.

(20) When the standardization of the tire diameter, size of tires and load carrying capacity of each has been determined, the axle designer is then in a position to produce his standardized axle, embodying in it the best or the cheapest design as he may see fit.

(21) **Rims for Pneumatic Tires.**—In order to perfect the standardization it is necessary also that the rims be further standardized, as those now adopted are based haphazardly and are really "unstandardized standards," as is evidenced by an examination of the data sheets of the S. A. E. As these rims always are, at least always should be, only used with one given size of tire, the general dimensions should be based upon the functions or percentage of the tire diameter itself, at least everything except the tire seat diameter, which is a specified constant of, say, 24 in.

(22) The next important or leading dimension is the width of the tire rim seat, and this must be such as to give the tire the necessary lateral stability and should not

be less than the cross section of the suspending air column, and which could be easily determined if the thickness of the tire wall and of the tube wall were also a specified percentage of the tire diameter. An examination of the S. A. E. data sheets show that these *widths of tire seats* vary considerably in some of the smaller sizes, but in the newer and larger sizes are very uniformly taken at 0.75 of the tire diameter, and if this is right for these sizes should also be right for all the sizes. The load carrying capacity and the ease, or rather hardness of riding of the smaller sizes of tires, is undoubtedly greatly due to this narrow width of tire seat, and to bring these tires into conformity with the other sizes they should be brought to the same basis for the width of the tire rim seat.

(23) The sizes of rims and the width of rim seats as given by the S. A. E. data and the proposed standardized widths are as follows:

Size of Rim	Width of Rim, Inches	Percentage Tire Diam.	Proposed Width of Rim, Inches	Proposed % Tire Diameter
3½-in. Clincher	2.05	58.5	2.625	75
3½-in. S. S.	2.312	66.0	2.625	75
4-in. S. S.	2.688	66.6	3.000	75
4½-in. S. S.	3.12	70.0	3.375	75
5-in. S. S.	3.75	75.0	3.75	75
6-in. S. S.	4.33	72.0	4.5	75
7-in. S. S.	5.00	75.0	5.0	75
8-in. S. S.	6.00	75.0	6.0	75
9-in. S. S.	6.00	66.0	6.75	75
10-in. S. S.	7.33	73.3	7.5	75
12-in. S. S.	9.00	75.0	9.0	75

(24) **Side Flanges.**—The side flanges also are unnecessarily high, as with the present form of solid or inextensible bead they should be made as low as possible, so that the partially or completely deflated tire should ride as softly as possible upon the side flange. Further, this flange should drop away as fast as possible from the side of the tire. The only function of the side flange should be to hold the tire laterally, and as at present made the straight part of this flange is only ⅛ in. and upward, but it does not drop away quickly enough. Therefore it is suggested that the standardized rim be constructed as follows:

Width of tire rim seat	.75	Tire diameter
Width of rim overall	1.00	Tire diameter
Side flange overhang each	.125	Tire diameter
Height of side flange total	.125	Tire diameter
Height of side flange straight	.05	Tire diameter
Height of side flange curved	.075	Tire diameter
Radius of side flange curve	.075	Tire diameter
Inside radius at base of side flange	.02	Tire diameter or nearest 1/16 in.
Thickness of rim	.04	Tire diameter or nearest selected gage

The saving in the weight in standardization of the rims as suggested would amount to 10 or 12 per cent and would be quite an item.

(25) The standardization of the rim, whether all the above suggestions are carried into effect or not, is absolutely essential, before fixing the wheel and demountable rim dimensions and the detachable wheel dimensions, as all of these are embodied in the proposed axle standardization.

(26) When demountable rims are used, the size and the number of the bolt should be specified for each size of tire, and the location of the center of these bolts from the center of the wheel should also be specified and should be the same for all sizes of tires using one-piece rims transversely cut. And it is suggested that this bolt center be stated as 23¼ in. for the 3 in., 3½ in., 4 in., 4½ in. and 5 in. rims, assuming eventually a 5-in. single piece rim may be made. For demountable rims using 2 or 3 piece rims it is suggested that this bolt center be 22¾ in. up to and including the 5-in. rim. Above this size the bolt diameters or centers for the 6-in. and 7-in. rims shall be — in.; for the 8-in. and 9-in. rims — in.; for the 10-in. and 12-in. rims — in. All demountable rims should be so designed that at least two sizes of rim can be used on each wheel, and it is suggested that this interchangeability shall apply as regards the 3½-in. and 4-in. rims, the 4½-in. and 5-in. rims, the 6-in. and 7-in. rims, the 8-in. and 9-in. rims, and the 10-in. and 12-in. rims.

(27) **Number and Size of Clamping Bolts.**—The number and size of clamping bolts used on demountable rims shall be as follows:

3-in. tires	5 bolts	⅜-in. diameter
3½-in. tires	6 bolts	⅜-in. diameter
4-in. tires	6 bolts	⅜-in. diameter
4½-in. tires	8 bolts	⅜-in. diameter
5-in. tires	8 bolts	⅜-in. diameter
6-in. tires	8 bolts	⅜-in. diameter
7-in. tires	8 bolts	⅜-in. diameter
8-in. tires	10 bolts	½-in. diameter
9-in. tires	10 bolts	½-in. diameter
10-in. tires	12 bolts	½-in. diameter
12-in. tires	12 bolts	½-in. diameter

(28) **Felloes.**—The width of all felloes should also be based on the tire diameter and should be 0.50 of tire diameter. The depth of the felloe (including the steel felloe band when used) should be definitely stated for each size.

(29) **Felloe Bands.**—Metal felloe bands when used in connection with demountable rims should also be specified as regards thickness and should be the same as the rim thickness.

(30) **Width of Wheel Tread.**—The width of tread for all sizes must be standardized and stated for both front and rear axles, and especially in the larger sizes involving the use of different size tires on the rear wheels from those used on the front wheels. It is all right to assume a basis of 56-in. tread for the smaller size of tires, but as a matter of fact this should be increased to 60-in. tread for the larger size of passenger cars in order to carry three passengers comfortably on the back seat, the width of the body would be such that it will extend to or beyond the center of the 56-in. tread wheel, making a very bad and clumsy looking body. In fact all rear mud guards should be attached to the chassis and not the body, the same as the front mud guards are, so that the touring body can be either removed or changed to a closed body, or vice versa, without having to disturb the mud guard.

(31) **Front Axles.**—The standardization of the front axle requires the location of the *center of the spring pad* as follows:

(a) Distance from the center of axle to the center of spring pad.

(b) Vertical distance from the center of the wheel to the top of the axle spring seat pad.

(c) Distance to the bottom of the axle seat pad when spring is placed under the axle. Axle to be designed for taking spring either above or below.

(d) Width of spring recommended for each size of axle (each size of tire) and also the size and diameter of the spring clips and bolts and the distances to the center of the bolt holes.

(e) Width of tread at center of hub and angle of wheel, if any.

(32) **Rear Axles.**—Same dimensions as above required and also:

(f) Type of axle either full floating, three-quarter floating or semi-floating.

(g) Brake drum — in. in diameter and fitted with two internal expanding brakes — in. wide as the minimum.

(h) The size and dimensions of the saddle for the differential must also be fixed for each size and probably many other dimensions may be essential.

(33) **Complete Standardized Axle and Wheel Units.**—In order to effectively standardize the axle it should also include the standardization by the axle maker of both the demountable rim wheel and the detachable type of wheel having the wire wheel form of hub detachability and an improved hub locking device. Even with the wood spoke type of wheel, the entire wheel construction bar only the wood

spider itself (which is a very small percentage of the entire wheel and can be obtained from any wood wheel maker) is entirely a metal and mechanical job as regards manufacture and assembling and should be provided and furnished by the axle maker. In connection with the detachable wheel the same applies whether the detachable wheel is wood spoke, metal spoke, wire, double disc suspension, single disc compression or any other type of wheel. Both the demountable rim wheel and the detachable wheel must be standardized and so designed as to interchange upon the same axles, and no one can do this effectively except the axle maker and the designer. In any case the axle maker must supply all the hubs, hub fixtures, rims, etc., even if he should sub-contract for the wood spider or the wire spokes, to be provided for his own hub and fixtures. In the case of the all metal wheel, its production *naturally* goes with the axle production, as the axle makers have the presses and all other facilities for making it. The result of attempting to produce metal wheels by an outsider or interloper is well illustrated by the condition of the present wire wheel makers (8 or 10 in number), all having *different standards* involving ten different sets of patterns and a tenfold expense for jigs, templates, tooling up, etc., which has now completely swamped them, and with the result that several of them are now in the hands of receivers. There is no logical reason why a car maker should buy his axles in *one place* and his wheels in *six places*. The axle maker who is in a position to supply his client with the *standardized axles* and *standardized wheels* of any type indifferently would pretty nearly control his trade and get the pick of the business, and by no other method can a practical standardization be brought about. Another important point is that the wheel repairs and replacements would be handled through the service stations of the car makers, which would be quite to their advantage.

(34) **Complete Chassis Unit.**—As several of the axle makers are also frame makers and spring makers, it is only one more step to provide the frame and springs and have a *complete chassis unit.*

(35) It will be seen, therefore, that in the hub and axle standardization there are enough basic points to be covered to give the S. A. E. sufficient to do without encroaching on the field of the designer.

W. J. P. MOORE.

Editor, AUTOMOTIVE INDUSTRIES:

I have your letter of April 20, asking whether I care to comment on Mr. Younger's letter on Hub Standardization, published in your March 10 issue, and on Mr. Moore's letter on the same subject which you propose to publish on April 28.

I have been quoted on this subject a number of times in your valued columns, and think my viewpoint has been pretty well set forth. I have purposely refrained from commenting on Mr. Younger's letter because the manner in which he has mistaken the issue is quite surprising in view of the fact that he has been conversant with the program of the Hub Standardization work since last June, and in view of his written and verbal approval of the work up to the time it was ready for submission to the S. A. E. Standards Committee.

It seems to me that the question is not one of "engineering individuality," but one of "economics." When an engineer or group of engineers produce a design that embodies the whole experience of an industry, is it not time to stop making inconsequential modifications and give the trade and the public the benefit of cost reduction and better service? Why not let the engineer turn his attention to other problems (which he will find no trouble finding), and let the manufacturing department have at least a Chinaman's chance at a good long production run? That the matter is one of economics is well borne out by the letter written to me on the subject by Mr. George E. Roberts, vice-president of the National City Bank. This letter was quoted, I think, in the March 17 issue of AUTOMOTIVE INDUSTRIES.

The Scotch have a gloomy way of regarding the efficacy of remedies that are not mixed in their own pharmacy, but I believe that a working acquaintance with the work that has been accomplished will relieve skeptics of their fears. Hub and axle design will not by any means become so petrified as one might think—in fact, the proposed recommended practice only defines the connecting assembly dimensions between definite sets of ball or roller bearings and the hubs and spindles which are to take them; it also gives similar dimensions between the hubs and the wheels that are to be mounted on these hubs. It has been done by the S. A. E. on so many other features that it is not only precedent but actually long-established custom. Moreover, nobody is obliged to follow the recommended practice if, in the course of time, he can design something economically better.

Mr. Moore seems to have used Mr. Younger's letter as an excuse for presenting another matter entirely. He devotes twice as much space to advocating standardization for tires and rims that he devotes to condemning the same thing for hubs and wheels. Before discussing his tire and rim suggestions it will be in order to hear what the members of the Tire and Rim Division of the Standards Committee have to say on the subject. As to the first twelve paragraphs of his letter: it seems to me that almost every one contains a statement that is in error, either due to his lack of information on what has been done by those working on the subject of recommended practice for hubs or due to the inclusion of a half truth, or due to a too general and inclusive scope in expressing his views.

It should be borne in mind that the Truck Division of the Standards Committee proposes to submit through the Standards Committee to the main body of the S. A. E. the following (to apply to front hubs for motor trucks):

1. A series of inch-dimension roller bearings corresponding to the best practice of 95 per cent of the truck production to-day.
2. A series of ball bearings which was advocated by all the prominent manufacturers of ball bearings, and which has the approval of the only large truck manufacturer using ball bearings.
3. A series of millimeter-dimension roller bearings that will interchange in the same hubs as the ball bearings.
4. Definite spacing between the inner and outer bearings.
5. Definite machine dimensions on the spindles and in the hubs for the fits of the bearings.
6. Definite location and size of hub flanges.
7. Definite location and size of hub bolts.
8. Definite outside diameter of hub to fit wheel bore.
9. Definite thickness and number of wood wheel spokes.
10. Definite relation between center line of tire, spoke and shoulder for the inner bearing.

"If this be treason (or suppression of initiative) make the most of it."

The program and its details have been approved by

1. All prominent makers of roller bearings.
2. All prominent makers of ball bearings.
3. All prominent makers of wood wheels.
4. All prominent makers of steel wheels.
5. Clark, Russell, Sheldon, Timken, Torbensen and Vulcan axle companies.

6. G. M. C., Mack, Packard, Pierce, White and a large number of builders of assembled trucks.

7. The Truck Division of the S. A. E. Standards Committee.

I have lived with this proposition for thirteen solid months and have yet to hear one valid argument against it. The advantages of the work are so manifest that the tendency on the part of those favoring it is to assume that there will be little or no opposition—hence the small vote at the January meeting of the S. A. E. Standards Committee. If all those who are in favor of it turn out and vote for it at the West Baden meeting on May 24 the majority will be quite impressive.

C. T. MYERS.

Bignan Cars Entered in Corsican Race

THE special four-passenger Bignan sport cars to be driven by Albert Guyot and M. Nougué in the 3-liter race around the mountainous island of Corsica have shown a road speed of 90 miles an hour. This race is limited to 183 cu. in. sporting type cars carrying windshield, fenders, four seats of stipulated minimum dimensions and having a certain minimum distance between the steering wheel and the tangent of the rear wheels. Under such rules the competitors naturally employed a purely racing type engine and as it was not possible to diminish body width, total height was kept as low as possible.

The Bignan-Sports have four 3.42 x 4.85 in. cylinders in a single casting. A three-bearing crankshaft is employed, with only a very light external flywheel, sufficient for the cone clutch. There are circular discs on the shaft of 1.18 and 0.87 in. face width. Four valves per cylinder are employed, the weight of these being 0.28 lb. for the exhaust and 0.247 lb. for the intake. A single camshaft operates the 16 valves, and is driven by an inclosed vertical shaft and bevel gearing. Lubrication is forced, with a dry pump. Delco dual ignition is employed, the plugs being mounted horizontally on opposite sides of the cylinder. The output of the engine is 90 hp. at 3,200 r.p.m. and 95 hp. at 3,400 r.p.m. The car has been built to the designs of M. Causan, an expert in high-efficiency engines.

Standard Bignan practice has been followed in the gearbox and rear axle. Owing to the mountainous and varied nature of the course, however, direct drive is on third, and the fourth is geared up, so as to get a high rate of travel on a 20-mile level straightaway by the side of the sea. The rear axle construction is a combination of steel tubes around which an aluminum housing is cast, with the whole of the brake mechanism inside the axle housing. The front axle and brake mechanism is a copy of Delage practice. Front and rear brakes are not linked up, but have separate controls in order to give the driver an opportunity of skidding the rear end of the car on the turns. The front springs are shackled at the front end and have a fixed attachment at the rear.

The wheelbase is 114 in., the track 49 in., the body width 39 in. and the fender width 8 in. With a road clearance of 7.8 in. it has been possible to keep the maximum height of the car as low as 40 in.—less than the overall width. The seats are arranged so that the shoulders of the driver and mechanic are flush with the top of the body. The gas supply is carried in the cowl, with a reserve supply back of the driver's seat, this being adopted in order to get a good weight distribution. No passengers are carried in the race, their equivalent weight being made up, however, by ballast. This makes it possible to carry the spare wheels inside the body and thus reduce head resistance. With an all-aluminum body construction and the use of light materials throughout, it has been possible to get weight down to 1750 lb., with full road equipment.

The four-cylinder 3.42 x 4.85-in. Bignan sport model entered in Corsican three-liter race

THE Society of Motor Manufacturers and Traders (Great Britain) has voted a substantial sum for a period of years to the Institution of Automobile Engineers, subject to a stipulation as to representation that is likely to be accorded, so that it is anticipated the arrangement will very shortly become definite. The Institution some time since placed before the Society a proposed extended programme of work, together with particulars of the financial position, and the matter has received careful consideration at a number of meetings. The Council of the Society agreed that the proposed work in question would be of value to the industry generally, and that the institution should be assisted accordingly.

AN ignition system capable of higher current economy than the ordinary closed-circuit battery ignition system, has been recently invented. The feature of the system is a control cam which determines the length of time during which the primary circuit remains closed.

In the ordinary closed-circuit battery system the breaker cam must be designed to keep the circuit closed at high speed a sufficient length of time to permit of the proper loading up of the coil, and at low engine speed the primary then remains closed for a much longer time than necessary which results in waste of electrical energy. In the new system the regular breaker cam and the control cam are located side by side on the breaker shaft. The angular position of the breaker cam relative to the shaft is controlled by a centrifugal governor for the purpose of automatic spark timing. In the same way the angular position of the control cam is controlled by the governor. The two cams are both under the breaker lever, and the effect of the angular displacement of the control cam is to widen the nose of the compound cam at low speed and thus keep the circuit open for a longer time than it would otherwise remain open. The system is designed by Ralph B. Macnish.

Maintaining Continuity Throughout Roller Bearing Manufacture

The methods used to produce roller bearings in a large plant are described in this article. The company discussed operates its own steel plant and conducts the manufacturing process from the raw material to finished product. Interesting taper gaging machine used.

By J. Edward Schipper

QUANTITY production of a precision product always awakens speculation concerning the methods employed to maintain accuracy and at the same time secure large output. Exactness of dimension and quality of material are necessary to the highest degree in tapered roller bearings. The performance of the part mounted on these bearings depends directly on the accuracy and quality of the bearing and, consequently, the requirements of the purchasers of bearings are of the strictest character. At the plant of The Timken Roller Bearing Co., in Canton, Ohio, the care exercised in the production of a quality product starts with the manufacture of the steel which is used as material in making these bearings.

The Timken company operates its own steel plant, which is a part of a chain of operations which go to make up the manufacture of a tapered roller bearing. In this plant 125 tons of steel are produced each day exclusively for bearing manufacture. A large percentage of the steel manufactured is .15 to .20 carbon. This steel is manufactured from selected scrap in a battery of four Heroult electric furnaces. The total capacity of the four furnaces is slightly more than 150 tons per day. The steel produced is straight carbon, as indicated, while some chrome alloy electric steel is also made.

The molten steel from the electric furnaces is poured into ingot moulds and after having cooled into ingot form is transported to a manipulator. This is a combined hydraulic press and electric manipulator where the ingots are pressed into bloom under a pressure of approximately 5 tons per sq. in. The hydraulic press exerts the pressure on the ingot, while the electric manipulator twists and turns the ingots about in exactly the same way as human hands would do in order to bring the pressure of the hydraulic press to the proper point in transforming the ingot into a bloom.

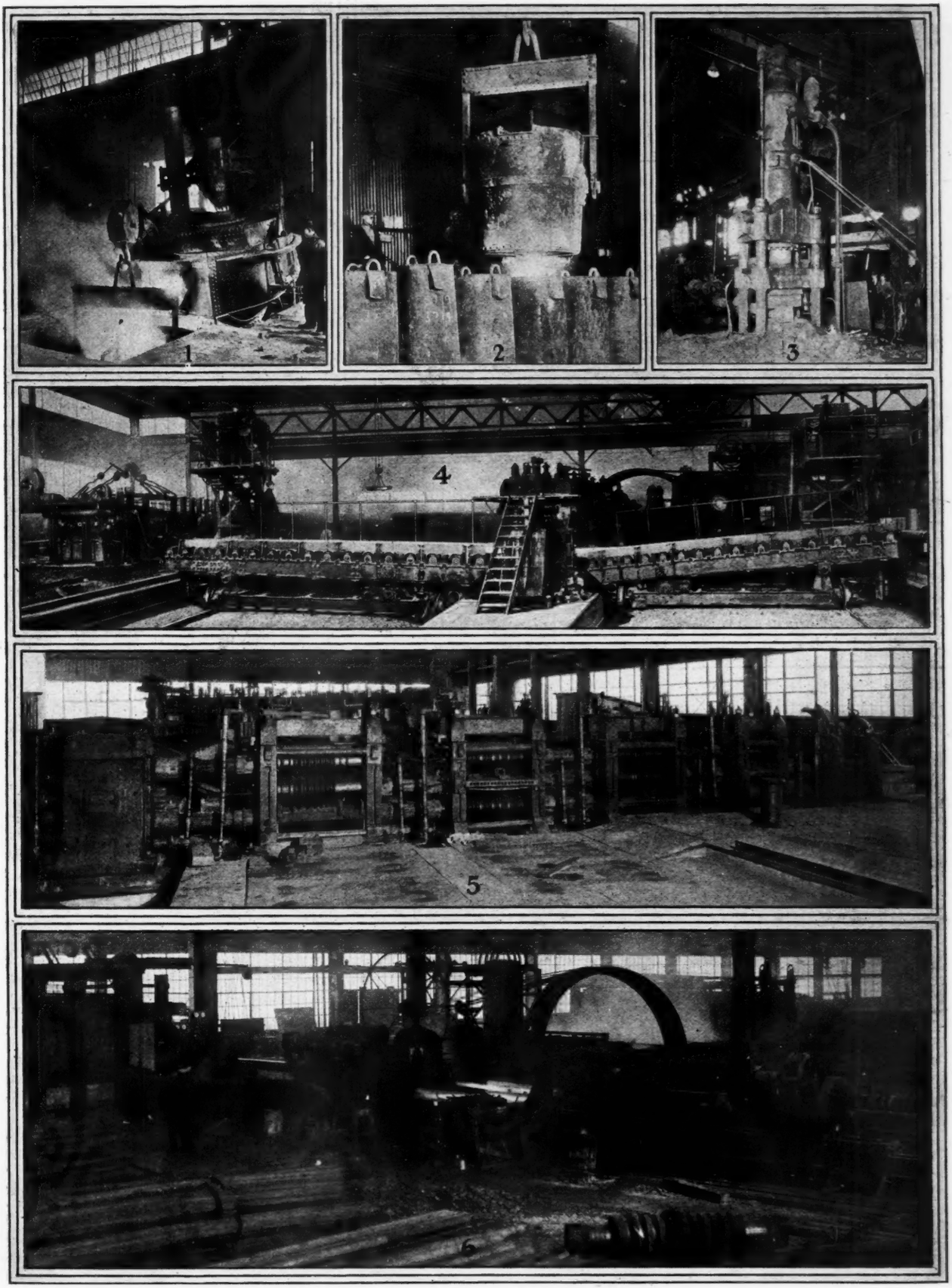
After the bloom has been formed it is transported to the rolling mills where a 22-in. three-stand rolling mill and tilting tables convert it into rounds and squares with a size range of from 2 in. to 6½ in. These are the raw stock from which the bearings are manufactured and are the forms which would be purchased if the Timken company did not make its own steel.

The first step in the actual manufacture of the bearings is to transform some of the bars into seamless steel tubes of a wide range of sizes to furnish raw stock for the cup and cone members of the bearing assembly. To do this the seamless steel tube is placed in the piercing mill, which takes the bar heated to a plastic condition and rolls it into tubular form on a specially formed device which converts the bar into a rough, unfinished piece of tubing. Another machine transforms this rough tubing into tubing of accurate size. The particular machine for the sizing of the tube is known as a reducing mill and after the tubing leaves this machine, it has been rolled accurately to size and shape externally as well as internally. The tubes are then cold drawn. As a final step in the manufacture of the seamless tubing, a straightening machine is employed. This takes out any bends or kinks which may exist in the tube. The tubes are then ready to pass on to the actual manufacturing operations as finished raw stock. They are handled in the automatic machinery from which the bearing parts are made.

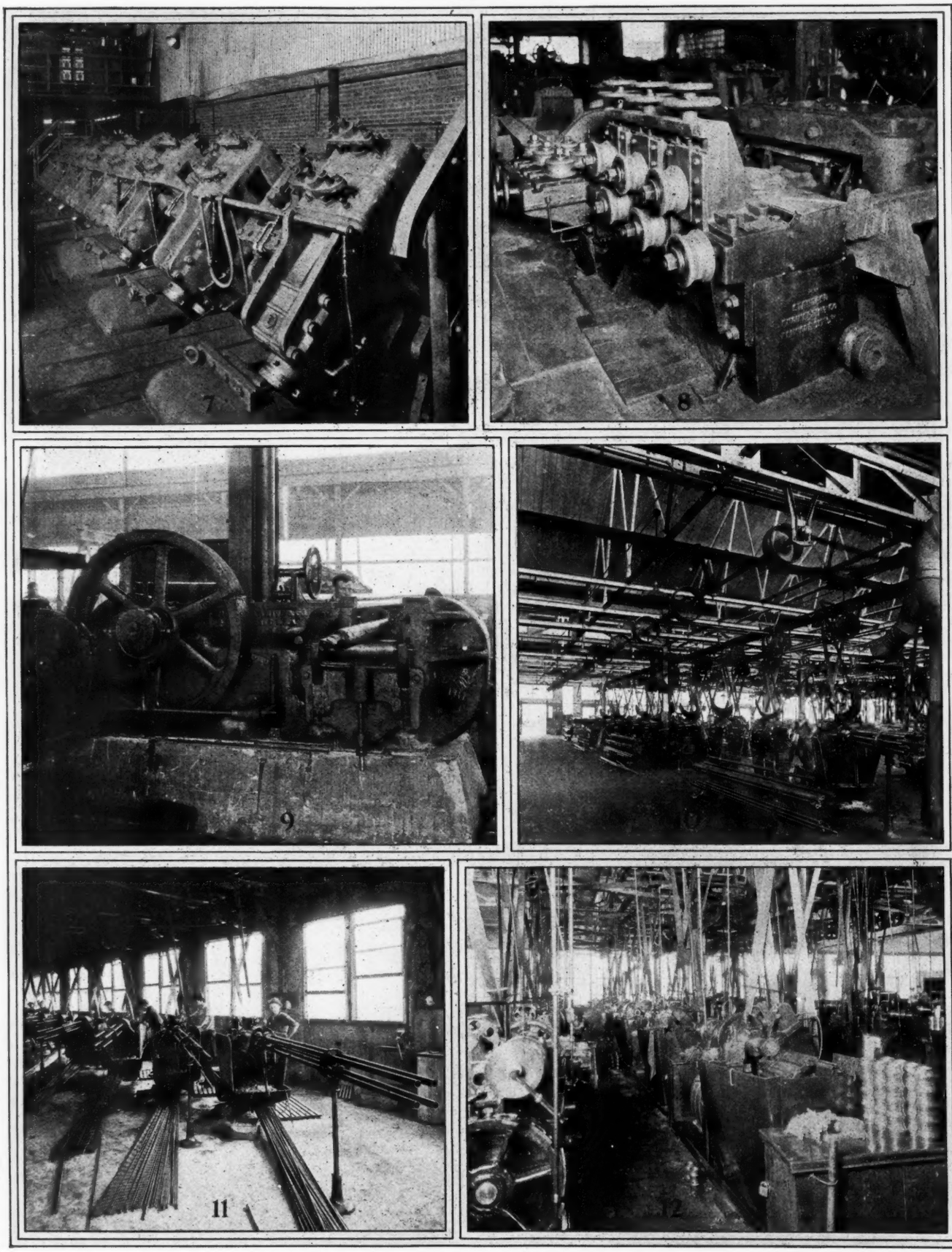
The Timken Tapered Roller Bearing consists of four principal parts. These are the cup or outer race, the cone or inner race, the rolls and the cage which acts as a roll retainer. For making the cup and cone, seamless tubing, manufactured as described, is used for the raw stock. For the manufacture of the rolls, bar stock is employed, made in the company's own steel mills by the methods described, except that instead of being rolled and pierced into tubing, the steel is rolled down to round bar form. For the manufacture of roll, retainer or cage, strip steel is used. This is bought outside.

The finished steel tubes are now ready to go to the automatic screw machine department to be transformed into cups and cones. The tubes are fed into the automatic in the usual way and the operation of forming the cups and cones is completed on a single machine. This same process is true of the roll manufacture, except that in place of seamless steel tubing being used for the raw stock, the rods are employed in their place. The rods are fed into the machine through the magazine end in the usual way and the rollers, which are finish-machined, are dropped into the pan of the automatic completely fabricated except for grinding. These Gridley and National Acme automatic machines comprise the bulk of the machining department at the Timken factory. In the automatic screw machine processes where the rods are fabricated into a variety of sizes of rolls, the machining tolerances are not in excess of .003 of an inch. The tolerances on the cups and cones are .004 of an inch.

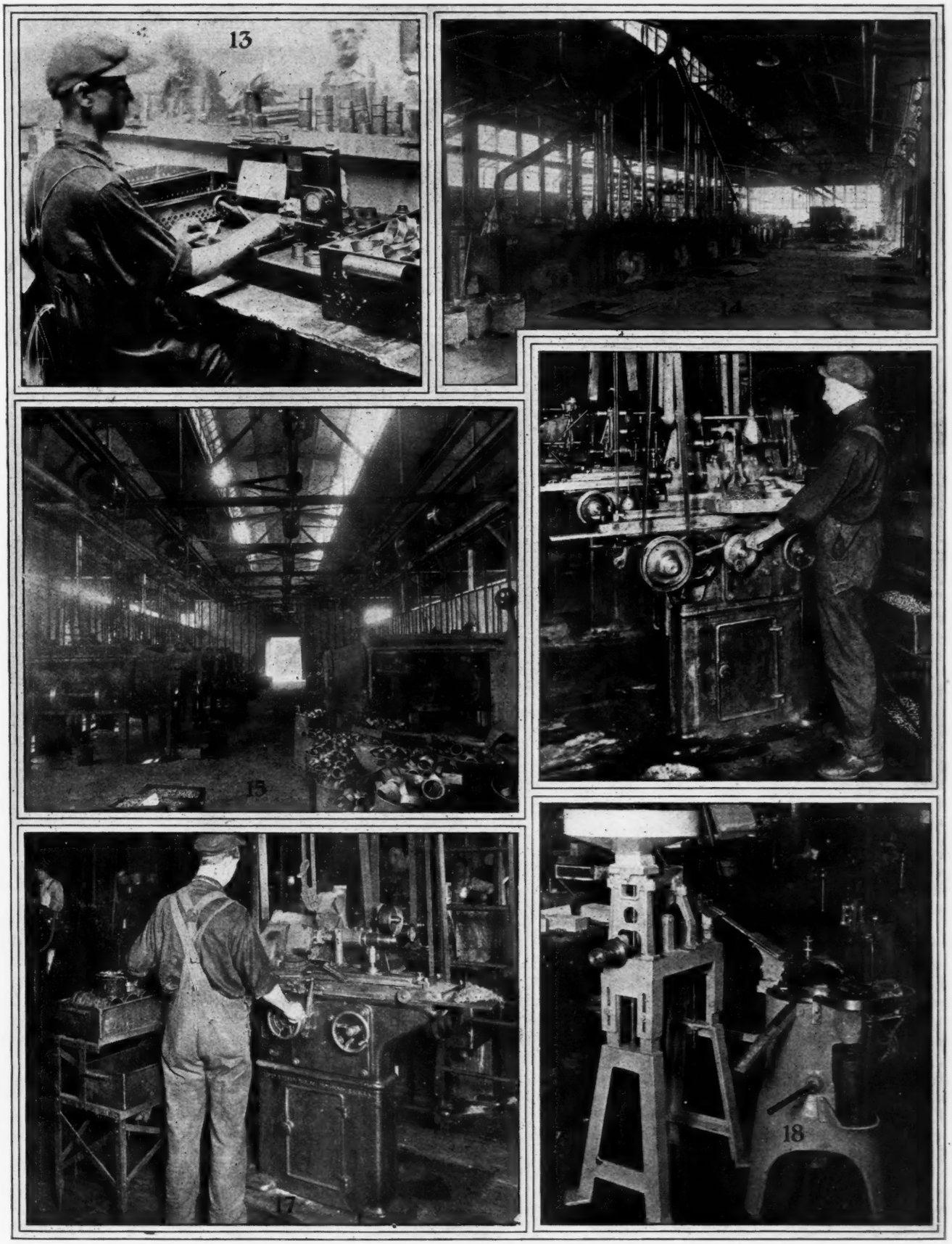
After the machining processes are complete and the parts have been gauged to size to find that they are within the limitations of the tolerances given, the products are placed in carburizing furnaces where the rolls, cups and cones remain from 16 to 48 hours, the time varying in accordance with the size of the part. Here the carbon content of the surface of the steel is increased by the aid of bone meal. The small parts are placed in rotary retort hardening furnaces where they are hardened after carburization.



(1) *One of a battery of four modern electric furnaces with a daily capacity of slightly more than 150 tons.* (2) *Pouring electric steel into ingot moulds in the Timken steel mill.* (3) *Hydraulic press and electric manipulator where ingots are pressed into blooms.* (4) *Twenty-two inch, three stand rolling mill and tilting tables where blooms are converted into rounds and squares with a size range of from 2 in. to 6½ in.* (5) *Twelve inch, three-stand rolling mill where bars for rolls are converted into coils and small rods.* (6) ***Piercing mill where bars are converted into seamless tubes.***



(7) *Reducing mill where pierced seamless tubes are automatically finished.* (8) *Straightening machine where finished seamless tubes are straightened.* (9) *Bulldozer for fabrication of formed seamless tubes.* (10) *Part of the screw machine department where tubes are fabricated on automatic screw machines into "green" cups and cones.* (11) *Four spindle roller fabricating machines where rods are fabricated at high speed into a variety of sizes of rolls held to machining tolerances not in excess of .003 of an inch.* (12) *Another view of the screw machine department where large cups and cones made from forgings are machined on automatic screw machines.*



(13) *Gaging in the "green." Size gaging machine where cups and cones in the "green" are held to tolerances not to exceed .004 of an inch.* (14) *Battery of carburizing furnaces.* (15) *Rotary retort hardening furnace where small pieces are hardened after carburization.* (16) *Automatically fed roll grinders where rolls are ground to tolerances of .0005 of an inch.* (17) *Internal cup grinder where cups are ground to tolerances not exceeding .001 of an inch.* (18) *Taper gaging machines where rolls are gaged electrically. All rolls not of exact taper are automatically rejected.*

(19) Part of the finished cup inspection department where cups are micrometrically gaged to a tolerance of .001 of an inch. (20) Part of the assembling department where parts which have passed the series of rigid inspections are finally assembled into complete bearings. (21) One of the stamping operations in the construction of the one-piece annealed cage or roll retainer. (22) Closing-in machine where the roll retainer or the cage of Timken bearings is formed to keep the roll in direct alignment.

After the case hardening process is finished, the parts are ground to finished size. The cups are ground on internal cup grinders and the rolls on the same make of grinder supplied with automatic feed. The tolerances on the grinding operations are .001 of an inch on the cups and .0005 of an inch on the rolls.

One of the most interesting machines in the entire process of manufacture is the automatic taper gauging machine where the rolls are gauged electrically. All of the rolls not of the *exact* taper are automatically rejected by this machine and scrapped. The machine operates in such a way that unless the proper taper exists on the roll, the machine opens a by-pass which permits the roller to escape into a rejection chute, which drops the rejected rollers into a pan. The cups are inspected by hand, being gauged with micrometers to a tolerance of .001 of an inch after they are ground.

The manufacture of the cage or roller retainer consists of a number of press operations. The strip is first blanked to a modified cup shape. The next press has a die which sizes the interior surface of the cup and completes the forming. The next machine trims the outside of the cup, after which it is annealed and the flange left on the outer rim of the cup is drawn in. The bottom is then punched out of the cup, after which it is again annealed. The cup is then tapered and on the following machine perforated, and then winged. The winging operation consists of turning in the edges left on perforating to form the roll retainers. The cage is then spread and is ready for assembly.

The assembly of the roller bearings is a very simple proposition, the rollers being slipped into the cage or roller retainer and assembled in the cup and cone by hand. This work is largely taken care of by girls at this Canton factory. After the bearings are assembled they are inspected to see that all rolls revolve freely and that they function in the proper manner.

This routine method of manufacture is followed for practically all of the products of the company. A few of the very large size bearings have cups and cones made from forgings, and in the case of the very large bearings, the bigger cups and cones are formed hot in a special upsetting machine. Outside of this, the small and large bearings follow along about the same routine process of manufacture, the making of the bearings being distinguished by the comparatively small number of operations necessary for manufacture.

In the assembly work the rolls used on each bearing are selected by size so that even though they are held to close limits, the variation in the size of the rolls is not as great as the diametric tolerance limit. This is done by graduating the rolls with an electrical selecting machine which permits of selection by grading the rolls in very minute steps or stages. The rolls are carried around on a machine which, by a set of electrical contacts ingeniously devised, is so arranged that each roll

drops into a bin with its fellows of corresponding size. Thus, when a bearing is made up, rolls which have dropped into the same bin are selected, giving no chance for variation in the uniformity of bearing surface around the periphery of the bearing.

The interesting feature in the manufacture of this product is that in spite of the accuracy which must be maintained and the necessity for absolute uniformity and interchangeability, the machinery used is of the highest possible production capacity. The three most important parts of the bearing, the cup, the cone and the roll, are manufactured almost entirely on automatic machinery and finished by grinding.

The grinding operations have been worked out on a production basis so that the time required for chucking the pieces is reduced to a minimum. The Timken plants in America and Europe produce 100,000 bearings per day when running at normal capacity. When it is considered that this number of bearings is produced uniformly with a smooth flow from raw material through the process of steel manufacture, then the manufacture of seamless tubing, and finally to the manufacture of the finished bearing, it can be seen that an efficient production lay-out is required.

The reason, of course, is automatic machinery. As a matter of fact, the space required for the actual manufacture of the bearing is small compared to that required for the manufacture of steel and for the assembly and testing work. The actual fabricating operations are so concentrated by the use of the automatics that outside of a bolt and nut factory it would be practically impossible to picture any producing organization which is so highly concentrated as that of this bearing manufacture.

By manufacturing its own steel, this company is enabled to keep its product uniform, which would be difficult were the steel purchased outside, where the run of material for the Timken company would only be one of many other runs. It would necessitate a contact with the source of supply which would be inconvenient to maintain and probably unsatisfactory. On the other hand, the steels utilized in the manufacture of the bearings are of standard specifications, so that if labor trouble or any other disturbing cause arose in the steel plant of the Timken company, it would be possible to purchase the standard steel elsewhere.

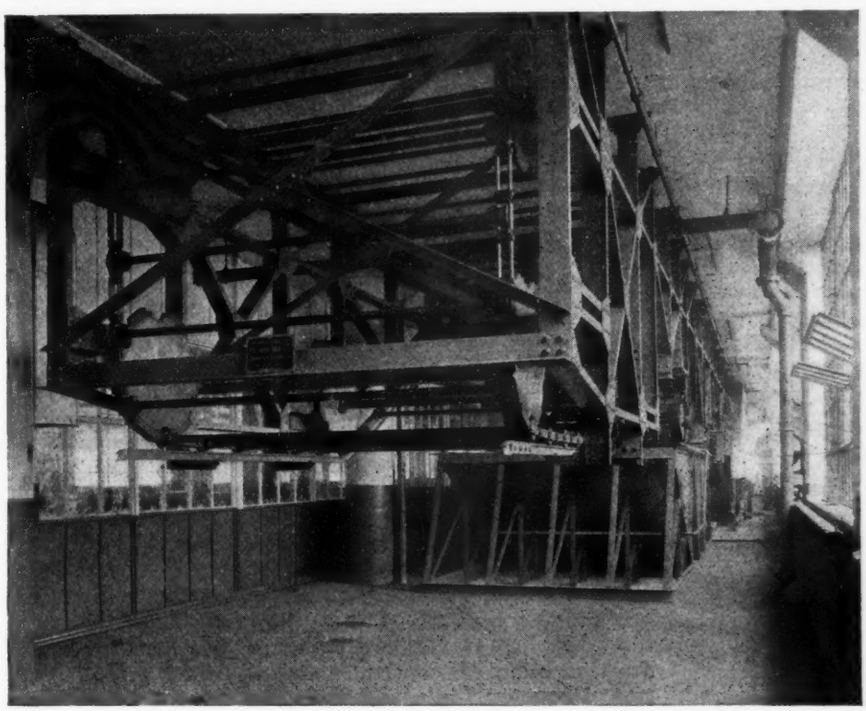
In very few industries is it possible to go back so far to the elementary material. Manufacture of the bearing really starts at the pile of steel scrap in the Timken yard. This steel scrap is stored outdoors and indoors for summer and winter consumption It is properly blended with the necessary fluxes and ferroalloys in the company's own plant, thereby putting the quality of the bearing directly under supervision at the inception of manufacture.

Continuous Motion Enameling Equipment

THREE installations have recently been completed for the baking of enamel on automobile fenders, hoods, etc., at the Cadillac Motor Car Co., Detroit; the Packard Motor Car Co., Detroit, and the Buick Motor Car Co., St. Louis.

The ovens at the Cadillac and Buick plants are of the continuous conveyor type, the work being hung on an overhead moving conveyor which automatically carries the parts down into the dip tank of enamel, up the drain board, into and through three ovens, progressively for three coat baking, without removing the work from the conveyor. Electric heaters of 2000 kw. capacity are installed in the Cadillac ovens and of 1680 kw. in the Buick ovens. These ovens are maintained at 450 deg. Fahr. by means of automatic temperature control equipment.

The Packard Motor Car Co. placed one of the largest orders during the year for heating equipment. This is in connection with the new six cylinder car, and consisted of 22 semi-continuous conveyor oven equipments, having a capacity of 3120 kw. The temperature of each oven is automatically controlled. The Packard Co. previously had some 12 or 15 electrically heated ovens in operation. Electrical equipment was manufactured by Westinghouse Electric & Mfg. Co.



General view of continuous conveyor for enameling ovens at Cadillac Motor Car Co. plant. Note the dip tank in the foreground

Heat Treatment of Valve Steel

THE proper heat-treatment for the valves of internal-combustion engines is given in an English house organ as follows: 3½ per cent nickel steel should be normalized at 830/850 deg. Cent. No further treatment is necessary. 25 per cent nickel steel should be normalized at 880/900 deg. Cent. No further treatment is necessary. 13/18 per cent tungsten valves should be heated to 950 deg. Cent. and cooled in still air, then reheated to 800 deg. Cent. and cooled in still air before machining. 13 per cent chromium valves should be heated to 900 deg. Cent. and cooled in oil, then reheated to 700 deg. Cent. and cooled in still air before machining.

Tide in Export Trade Is Turning

Stocks of automobiles in foreign trade centers are being liquidated and by the time the buying season south of equator opens there should be a steady flow of orders. Time element very different from that in domestic field and positive business should come shortly.

By George E. Quisenberry*

INDICATIONS accumulate that the export market for automotive equipment is again on the upgrade and that, despite the gravity of conditions affecting many other commercial lines, the liquidation of the surplus stocks of passenger cars, trucks and tractors in some of the larger foreign centers is progressing favorably. Manufacturers and foreign dealers are working more closely together than ever before in an effort to clear the market of these holdover goods and, as one export manager recently said, makers and sellers are beginning to get really acquainted with each other. The ultimate benefits to be derived from this can easily be imagined, and it is to be hoped that the exporters of this country will do everything possible to hold the business friendships they have made during the last few years.

The export market has not picked up to the same extent that has the domestic retail trade. It was to be expected that it would be several months behind the home market, but there is everywhere apparent the feeling that the tide has turned and that coming months will see a gradual but certain revival in the foreign sales of practically all automotive lines. One large New York exporter, naming the numerous countries in which his lines are being pushed, reported that the low points of retail sales had been January in certain districts, February in others and March in the remaining divisions. In each there has been a gradual quickening in retail sales of the foreign dealers since the low point, and, while few shipments of new stocks have yet gone forward to any of these sections, inquiries were being received and other evidences pointed the necessity of additional shipments shortly.

A second manufacturer, whose line has been very thoroughly and carefully handled in the foreign market, declared that his overseas shipments in March were 25 per cent of normal and that he expected them to be 50 per cent within 60 days of that time. Another exporter summed up the same condition by reporting a "much more favorable tone"; this is borne out by reports received from several foreign centers which spoke of a trade revival that seemed certain in the middle months of this year.

Far-Flung Field

The foreign manager has his field so far removed and covering such great stretches of territory that it is difficult for him to keep in close and immediate touch with his overseas connections. He does not, like his sales brother in the domestic field, have the unlimited services of night messages and special delivery letters, with voluminous reports from business publications and official or semi-official organizations to keep him constantly informed on the course of business in the districts where he disposes of his wares.

The export manager, taking full advantage of every available agency, must develop a sense of feeling or ability to interpret conditions in countries many days or weeks distant by steamer and mail. This ability to sense the markets is one of the chief qualifications of the good export manager and, without it, he is liable to find himself lost.

In New York, at least, it may be said that the exporters are "sensing an increased business." Certain countries, they know, have not yet passed through the business valley from which North America seems now to be ascending. But other countries have done so and are definitely on the upward trail again. Here and there may be found cities and even countries which have scarcely felt the depression, and these places, with those countries which have gotten past the bottom, are being "sensed" as offering positive business within the next few months.

The writer has recently talked with an American exporter who has just returned from a two-year trip in the foreign field. Thoroughly familiar with the district in which he traveled, this man was quite positive that extensive buying should be expected within the next two or three months. The reason for his expectation was that this particular territory is south of the equator and, consequently, enters its sales season in September and October. Last year and the year before the market was not well supplied at that time, orders had not been placed early enough, production and shipments were delayed and many dealers had scant stocks at the time when the real buying season got under way.

Time to Get Busy

This condition should not be repeated another year, the exporter declared. Manufacturers should begin now to go after this business, remembering that foreign transactions cannot be carried out in the few days that might suffice at home. If you would have good business in September and October, he said, prepare for it in March, April and May and be ready to make shipments in July and August, if not in June.

As a concrete example of this assertion the National Cattle Show of the Sociedad Rural Argentina will be held in Buenos Aires the first two weeks of September. It is to be presumed that every American exporter who sells to the River Platte territory will endeavor this year to exhibit his goods at that show. Undoubtedly it is the most important showing in all of South America, drawing hundreds of thousands of visitors from Argentina, Uruguay, Chile and other nearby countries, transcending in importance, from an automotive standpoint, even the annual motor car show of the Automovil Club Argentino, which is held a few weeks later. And, be-

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cause of the general conditions of business and trade, as well as the lessons learned domestically from the shows held at home this spring, there is every reason to believe that few exporters will pass up the Argentine cattle show this year. It must be used in an attempt to restore retail buying to a satisfactory level.

So, the manufacturer or exporter has learned of this show in late April or early May. He wishes to find out about space, about the arrangements for the exhibit, and he must take up these points with his distributor or other connections in Buenos Aires. He writes to Argentina the first week in May and the letter reaches its destination three weeks later, about the first of June. Let us suppose that the letter is answered immediately, although it would be rather doubtful if such quick service could be accorded. The reply requires three weeks more, and the month of June has practically passed away before it is received in the exporter's office here in the United States.

Consider the Time

Possessed with the detailed information required and having come to an agreement with his Buenos Aires connection, the exporter then must prepare for the exhibition, which starts two months later. Perhaps a new model or a special design must be shipped, as undoubtedly will be the case with many makers this year. The factory is asked to rush the order through, and the car is crated, shipped and arrives at New York in the latter part of July. Then it is rushed to a boat and sent on its way by August 1, reaching Buenos Aires just in time to get through the customs house, be uncrated and set up before the exhibition opens. Four months have passed, and it is doubtful if all the arrangements could have been handled satisfactorily in a shorter space of time, not forgetting that the exporter can take advantage of the cables to hasten his attempts to obtain information.

Previously it has been said in AUTOMOTIVE INDUSTRIES that foreign trading is not an impulse undertaking, that results cannot be expected over night from the first attempts to work up an export trade. This is even more true to-day than it was six months ago, and the statement is amply proven by the mistakes made by some companies which have attempted ill-advisedly to get into this lucrative business. But it does not mean that American manufacturers should not redouble their efforts in the foreign fields; the automotive development of the four corners of the world has no more than started.

We shipped heavily to all countries during 1919 and 1920 and, on the face of immediate business in sight or in prospect for the next two or three months, it may seem that the trade of those two years was excessive and abnormal. Perhaps it was, but the men most closely connected with the overseas markets believe that the start only has been made. The great developing countries, such as Latin America, Australia, South Africa and the Far East, have no more than begun the motorization that must come about during the next few years. Those countries to-day stand generally where the United States stood ten years ago or even longer. Then we were just beginning to use the automobile, the motor truck and the farm tractor. Our great development has come since that time. We were then beginning to talk of better roads, and the motor car was just pushing its way into the great farm areas.

Only the Beginning

That is the condition to-day throughout many countries of the foreign field. The belief that the automobile is a luxury for use only in the cities is just being overcome. Our pioneer companies—and any exporter can count them on the fingers of his hands—have done their work well and have started what ultimately will mean a much wider and more universal use of the essential motor car. Road improvement is just getting under way in many localities, and the development of the next few years in this regard doubtless will dwarf anything of the past.

The present months are no more than a breathing spell and already there are numerous indications that the immediate situation is about to mend. The stocks of cars that have been held up in ports and warehouses are being liquidated, just as they were liquidated in the domestic market. That movement is progressing slowly but certainly. In certain cases manufacturers have made concessions or affected compromises with their foreign dealers in an endeavor to wipe out the holdover stocks. Some companies, their sales policy not so well defined, are still faced with large supplies in their overseas markets and they will, of course, bear the burden for some months to come. But those which have not shipped so extensively and which have reached close cooperation with their distributers are getting to their feet again, their comparatively small stocks dwindling as retail trade has revived. These companies have nothing to fear in the future and can look forward to a continued increasing trade. Those which have erred will bear the consequences.

Thus we have a situation promising for those companies which have not compromised themselves during the last few months. Likewise, we have every reason to feel confident that the foreign trade of the automotive industry of North America will continue unabated. There will be competition that was lacking during the wild-cat days following the armistice, but that will not hurt the markets for our products.

The exporter has for his field of endeavor the entire world. As he views it to-day there are many spots and many localities under the shadow. Many others are just beginning to get into the sunlight again and to feel the beneficent results of the trade revival. The shadows will not entirely disappear for many years, but the whole world will not remain much longer under the cloud.

Service with the Car

SERVICE—the large initial belongs there—is the keynote of foreign sales, according to E. G. Poxson, export sales manager for the Dort Motor Car Co., who is, likely, more familiar with his foreign field and sales facilities than any other automotive export sales manager in this country. Poxson has lived and worked with his foreign representatives. He does not set any of these representatives up in business until he understands their motives and until they understand his methods.

He has spent much of his time abroad since he took this job, and he has seen hundreds and scores of American machines laid up indefinitely because there were no service parts in the country where the machine was sold. He is quite happy to say that this is not the case with the Dort cars. Service parts and an understanding of the mechanism of the car are quite necessary to the sale of Dorts in any part of the world.

Poxson is quite optimistic over the prospects. He says that the tide turned with him in several countries early in the year, and he anticipates a very good demand before the year ends. Even at the period when the demand for American cars was at the lowest, orders for Dorts were coming across the water because of the service idea.

Association for Purposes of Constructive Co-operation

The automotive industry seems to have been a target for legislative bodies recently. A new branch of automotive manufacturers has found the possible benefits of association. The Motor Vehicle Signal Manufacturers Association was formed to oppose something, but its future holds possibilities for constructive action.

THE prevalence of manufacturers' associations composed of companies engaged in a similar line of business indicates a growing realization of the interdependence of the units of modern industrial organization. Such associations, when they comprise the strongest elements in a particular trade, hold tremendous potential power for accomplishing constructive purposes. They hold similar power, of course, for accomplishing selfish ends, but the ultimate business futility as well as the moral injustice of combining for such entirely selfish purposes is being understood more fully every year. The current efforts of the Federal Trade Commission will probably tend to widen that understanding still further.

Clyde Jennings has pointed out in recent articles, however, the necessity for constant and intelligent watchfulness on the part of manufacturers as regards ill-conceived and unhealthy legislation, both national and local, tending to work injustice to both automotive manufacturers and consumers of automotive products. This does not mean lobbying for selfish legislation, but making certain that the laws which get on the statute books are intelligently framed so as to allow a healthy and permanent growth for all parts of the industry; a growth which will result in the ultimate benefit of the consumer as well as of the manufacturer.

The manufacturers of another branch of the automotive industry banded together last Monday for such constructive purposes and will add their efforts to those already being exerted to push constructive legislation and prevent narrow laws being passed. This new association is to be composed of the manufacturers of rear-end signals for cars and trucks, and its name will be the Motor Vehicle Signal Manufacturers' Association. The association was formed directly as the result of an unfortunate ordinance which was almost passed by the City of New York, and indirectly as the result of the realization by a large number of the manufacturers of the potential benefits of co-operative effort.

The ordinance in question is an interesting example of what may be done by legislative bodies as much through ignorance as through malice. The story of its origin and change is of interest because the same sort of thing is likely to occur in connection with other branches of the industry.

The ordinance as introduced read in this way:

> " . . . In order to avoid rear end collisions every motor vehicle, except motorcycles, shall, in addition to the red light, visible in the reverse direction, herein provided for, be equipped with a rear end traffic signal which shall indicate both by day and night that the said motor vehicle is about to slow down. The said light or signal shall be so operated from the foot brake or clutch that the operation of the foot brake or clutch shall result in the light or signal clearly showing that the vehicle is about to slow down.
>
> "No lamp, device or signal shall be used unless the same shall have the written approval of the commissioner of licenses, but no type of lamp, device or signal shall be approved by the commissioner which shall cost more than $10 complete."

When it is recognized that a large percentage of the signals manufactured operate electrically, that many of them contain the words "stop," "right turn," "left turn," etc., instead of "slow down," and that only one signal on the market comes within the terms of the ordinance as to both price and construction with the terms of the ordinance, the unfairness of the situation becomes obvious.

The danger of the ordinance being passed came to the attention of one New York signal manufacturer, who immediately took the matter up with the alderman responsible for the ordinance. As soon as the matter was explained to the alderman he admitted the injustice of the ordinance, said that he didn't know anything about signals, but had seen one like that described in the ordinance and had thought it was a good one. He offered to present an amendment at the hearing.

The signal manufacturer who had visited the alderman got in touch with a number of fellow manufacturers before the hearing. When the hearing was held a group of signal manufacturers attended and presented their case, and the ordinance was amended in such a way as to strike out the limiting provision and allow the use of practically any signal now manufactured.

Thus the necessity for such efforts as are so ably being put forth by the association was brought forcefully to the attention of the signal manufacturers. The result was the initial meeting for the formation of an association, which was held on April 25. At this meeting there was a good attendance from manufacturers within striking distance of New York, while letters were read from a number of more distant manufacturers expressing their approval of the association plan and stating their desire to co-operate in every way.

At this preliminary meeting the first steps for forming the association were taken. The name, Motor Vehicles Signal Manufacturers' Association, was approved and a committee was appointed to draw up by-laws and to make definite suggestions for future procedure.

It was the idea of those present to include in the membership of the association all the signal manufacturers in the country, and to ask those associated with the International Signal Manufacturers' Association, a

Pacific Coast organization, to associate themselves with this new body, whose activities may be expected to assume a broad and constructive scope.

The desire was also expressed to bring this new association into active touch with the work of the Motor Vehicle Conference Committee, so that the new organization's efforts might assist and work in harmony with those of the other organizations affiliated with the Conference Committee.

E. J. Livingston, 160 Fifth Ave., New York City, was appointed temporary chairman of the organization and his office designated as the temporary headquarters.

Another meeting of the association will be announced in the near future. To this meeting all signal manufacturers will be invited to send representatives, that the organization at its very beginning may comprise the best ideas of the entire industry. The representative nature of the attendance at the organization meeting and the constructive ideas voiced by those present indicate that the new organization will be able not only to further its own plans ably but also to effectively assist the other members of the Motor Vehicle Conference Committee.

A Non-Metallic Gear Material

UP to a few years ago practically all noiseless gears were made from rawhide or hard fiber. Both of these materials are unsuitable for timing gears, because they swell and distort when immersed in oil. Recently a number of non-metallic materials have been developed which have sufficiently high mechanical properties to permit of their use in toothed gearing and are non-sonorous and impervious to oil and alkalis. One of these materials, known as Condensite Celoron, contains two basic elements, Condensite (a phenol-formaldehyde condensation product) and fabric. The following particulars regarding the material and its use for camshaft gears have been furnished us by the manufacturers:

The material is as strong as cast iron, is not affected by moisture or oil, possesses a high dielectric strength, is chemically inert, insoluble, infusible and resistant to most acids. It can be kept in storage indefinitely without deterioration and is not attacked by rodents. When properly applied and lubricated it will often outlast cast iron and brass.

One of its distinctive features is its greater resiliency, or, rather, its greater resistance to shock, as compared with cast iron. Condensite Celoron is self-supporting and generally neither bushings nor flanges are required. If strain is severe the use of end plates is advisable, but teeth need not be shrouded. Pinions made from Condensite Celoron run successfully against gears of cast iron, steel, brass or bronze. The face of the pinion should always be equal to or less than that of the mating gear. Condensite Celoron pinions should never be run with gears having cast or badly worn teeth. In the case of timing gear trains with three gears, it is customary to make the center one from the fabric material, but oftentimes if this gear requires a great deal of machining or has an offset hub, it is better from an economic standpoint to have the two outside gears non-metallic.

Condensite Celoron has a tensile strength parallel to the laminations of 12,000 lb. per sq. in. and perpendicular to the laminations of 8000 lb. per sq. in. The compressive strength parallel to the laminations is 17,000 lb. per sq. in. and perpendicular to the laminations, 35,000 lb. The transverse strength is 17,000 lb. per sq. in. Other physical properties are: Brinell hardness, 30 to 40; specific gravity, 1.4; weight, 0.05 lb. per cu. in.; water absorption, ½ to 3 per cent in 24 hours. Up to a temperature of 300 deg. F. this material shows no material change in physical properties.

Condensite Celoron may be machined the same as metal. It cannot be molded, but when in the uncured state may be formed into special shapes. It will take a high polish. In turning, the piece should be turned to size whenever possible with one cut, but when two cuts are found to be desirable, the finishing cut should remove at least ⅛ in., as it is not always possible to turn a piece with a uniform diameter where a lighter cut is taken. The material should be turned at a peripheral speed 25 per cent faster than cast iron. A coarse feed and a wide-nosed tool should be used. The tool should not be raked but plenty of clearance should be allowed. No lubricant is necessary. The turning tool is dulled very quickly and should be frequently sharpened.

Drills should be run at high speeds, sizes ¼ in. and under, from 2500 r.p.m. to 10,000 r.p.m., and larger sizes in proportion. A drill in Condensite Celoron cuts smaller than itself and if the drill is properly ground, the hole will be clean and true, but about 0.003 in. undersize. If it is necessary to have the hole of the same size as or a little larger than the drill, the drill should be ground slightly off center.

Condensite Celoron may be sawed with either a band or circular saw. In milling it with standard milling cutters, high speeds and coarse feeds should be used. Whenever possible, all material should be removed in one cut. The use of a reamer is not recommended. Where accurate work is necessary, the holes should be drilled and then bored. The material is manufactured by the Diamond State Fibre Co.

Government Research in Road Construction

(*Continued from page* 906)

the rear of the three and are so located between the tracks of the forward wheels. Each wheel is independent of the others, and its whole weight rests on the road.

This wearing machine is constantly hauled back and forth over the experimental road section by means of a stationary engine and a steel cable. There is some lateral play to the wheels and the wearing surface is practically 12 in. wide. These tests are intended mainly to determine the wear-resisting qualities of different paving materials used in the cities where there is still a great deal of heavy horse traffic on steel tires. The experimental road comprises 48 different sections, including 21 of brick, 19 of granite and 8 of concrete. Photographs of the sections are taken at intervals and photos of the same section are mounted side by side, to permit ready comparison of wear. Fig. 21 shows five of the sections in four different stages of wear.

WITH the increase in the use of farm tractors the market for large stationary farm engines—engines of 10, 15 and 20 hp.—has declined materially. Formerly silo-filling, for instance, required an engine of this size, but now the tractor engine usually serves the purpose. The market for small farm engines, on the other hand, is not appreciably affected, as the farmer cannot afford to run the tractor half a mile or more every time he wants to do some corn-shelling or run the lighting plant.

View the Labor Problem in Perspective

Temporary conditions may delude the manufacturer into thinking the labor problem solved. It is not. In this article, Mr. Tipper tells what some workmen are thinking on the subject. Their views indicate future actions and conditions. The problem must be tackled. Now is the time.

By Harry Tipper

A GROUP of manufacturers were discussing business conditions and grumbling at the difficulty of getting enough business to make ends meet.

During the conversation, which ranged all the way from the hopes centering in the new government to the cancellation of contracts, some one introduced the question of labor.

"How do you find the labor situation?"

"That's all right, there is no trouble about labor, except that we haven't enough work for the men we have. Everything else is fine. These fellows are sticking on the job now. They don't want to lose the work they have with all this unemployment. They're getting down to business and cutting out all the foolishness we had last year.

"No, I guess our troubles in that direction are passed, we don't expect to get into the same jam we had last year. Any way, business does not look like a rush for a long time; meantime these fellows are learning that a good job is worth sticking to."

"Did you go on with the conference system your industrial relations man started last year?"

> **"No! We cut all that stuff out. Most of it was a waste of time, any way. Talking about a lot of things that ought to be decided in a few minutes. Going over a lot of trifles. Why those fellows spent all kinds of time mulling over why this man was fired, what should be done about light and ventilation in the dark part of the machine shop. I got pretty sick of it; believe I would have stopped it, any way. When the plant closed down I just took advantage of the situation to cut it out. I fired all the industrial relations department except Jones, he was a good man, so I put him under the production manager—he's working shop discipline and method."**

"Well! I guess you're right. The old-fashioned way of handling a shop was best. You just told the men what to do and they did it.

"All this talk about the worker's point of view is new stuff, mostly started by the armchair theorists who never ran a shop in their lives. Probably wouldn't know what one looked like. What do you expect on raw material prices next month?"

So the matter was dismissed, the advantage obviously with the manufacturer and the half-hearted attempts at new human organization all disbanded when the employer's dominance has been regained.

This conversation occurred as I was on my way to some of the industrial cities in the Middle West. I thought I would check up and find out what the worker had to say about it. So I talked with some of the mechanics I noticed outside the employment offices, some of those I found on the cars coming home from work, and some of those who did not appear to be working, nor looking for work at the moment.

> **To these workers the labor problem was not solved at all; it is never solved. It is the big problem of their lives. When they have work the families eat and enjoy comforts, when work is scarce they lose first the comforts and then part of their food ration. They did not know why work was plentiful last year and scarce this year. They did not know how long the present job would last, or if they would get a job.**

Some of them were so foolish as to believe that the manufacturer was responsible, in a way, for the scarcity and many of them were frankly suspicious of the Capitalist class, figuring that they got all the best of it all the time.

The more belligerent men were thinking of the time when they could seize the advantage once more, the less belligerent were afraid and deeply afraid of the immediate future in the matter of eating and sleeping. One or two believed thoroughly that the manufacturer was playing to put them deliberately in a starving position.

> **Many of these opinions were without any evidence or foundation, they were undoubtedly incorrect—but their inaccuracy does not affect their existence and the fact that there is a labor problem.**
>
> **Unemployment is one of the phases of the labor problem. Lack of work when a man is healthy and ready to work is a disturbing factor of great moment and lays the foundation for much future trouble.**
>
> **Ignorance as to the reasons for unemployment is another item in the labor problem, one which leads to many beliefs and opinions that will affect the future action of these men on their jobs and in their political opinions.**

Organization is a growth; once begun it will continue to grow unless it is replaced by better types. The organization of trade unions was begun a hundred years ago, out of the fear of starvation, the suspicion of the employer and the demand of the worker for protection. Those same conditions to-day will form organizations of workers just as effectively as they did years ago. Unless these matters are dealt with, the labor problem still exists, although the pain and trouble is not visible for the moment.

Any manufacturer who is neglecting the human side of industry because he can control his workers for the moment, is as shortsighted as the man who determines his policy by the last six months and the next six months.

When the machinery is idle and there is no problem of

getting the work out, an opportunity exists to put the plant in shape for real work on a better basis. When jobs are scarce and the employer is not forced to listen to his workers, by the conditions, there is an opportunity to study the human necessities and lay the ground work for a better co-operation and a larger measure of human efficiency in future work of the establishment.

It will not be done by arbitrary methods of procedure. The old-fashioned way has no more to recommend it than the old-fashioned machine. It is just as clumsy, slow and inefficient in its results.

It is absurd for a manufacturer who prides himself on his up-to-date and efficient methods of manufacture, to deal with human beings as the employer of forty or fifty years ago. The production problem includes the labor problem. The increased production efficiency, the lowering of production costs depends largely upon the improvement of the incentive, skill and stability of the worker, who controls this production operation.

Study of mechanics will not overcome the inefficiencies of the human being. Arbitrary prejudice, opinion and decision will not solve the labor troubles. The sore spots still exist and the active agitators are still rubbing salt in these wounds. When men are idle they have a lot of time to listen. Are they listening to the employer or the agitator? Is the employer unconsciously handing the salt to the agitator by his method of handling the question? In a great many cases he is. It is the action of the manufacturer, which appears to be arbitrary and unfair that forms the text of most of the oratory of the agitator. To the man who does not know why he is out of a job, the whisper that the employer is still making money is enough to arouse his suspicion. To the man whose wages are cut, the statement that the concern has a big cash surplus they made last year is rubbing salt in his wound.

The salt is formed by the ignorance of the man plus the secrecy of the manufacturer, and it is a salt that will keep any wound open for years. There is a labor problem and there is a large opportunity how to study it while the trouble and interruption are not so visible or important. There is more available time for study and more available opportunity for experiment. The fact that there is no trouble does not justify the statement that there is no problem.

The problem must be tackled now or later, and what is done now will have a great influence on the character of the later developments.

Walter Raleigh says of language that "out of one hundred ways of saying a thing ninety-nine are wrong." Out of a hundred ways of doing a thing, humanly speaking, ninety-nine are wrong and lead to misunderstanding, suspicion and fighting.

Six-Wheel Bus Now Used in Paris

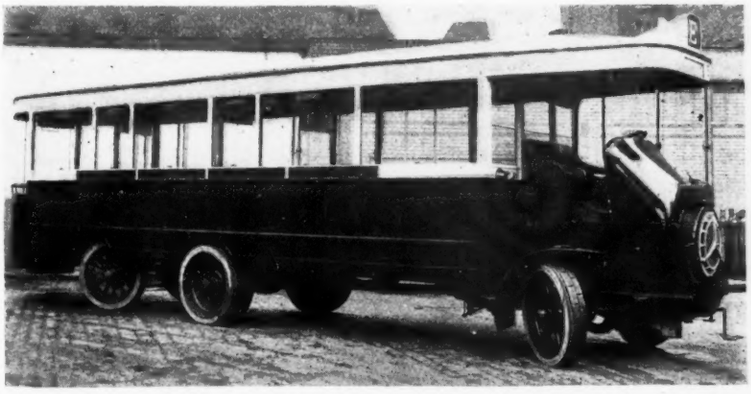
EXPERIMENTS are now being carried out in Paris with a six-wheel single deck omnibus steering through the front and the rear pair of wheels, and driving through the center pair. The advantage of the new type is that an increased wheel base and additional carrying capacity are obtained with the same turning radius as for the normal two axle machine. The experimental buses are being run on the Madeleine-Bastille route, which comprises the most crowded boulevards of the city.

No changes have been made in the engine, which is a four cylinder type placed under the driver's feet; the live axle is also practically the same, and the third axle is a duplicate of the front axle. Suspension is by means of three pairs of semi-elliptic springs.

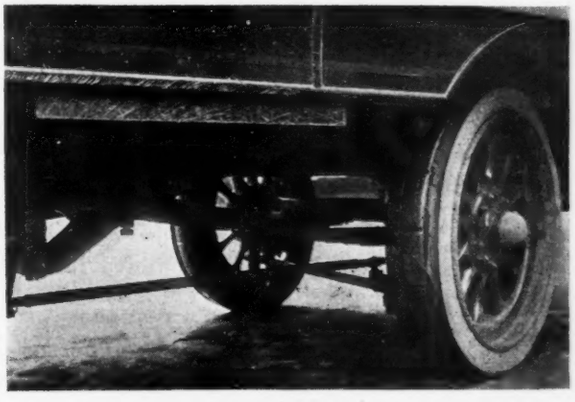
This type of bus is not entirely new, although this is the first time it has been used in Paris for passenger work. Before the war the French engineer Gros designed a similar type of six wheel bus, which was built by the De Dion Bouton Company and experimented with on the streets of Paris. Since the armistice the bus company has been making use of a three-axle chassis for tankers bringing gasoline and benzole from the refineries to the bus depots.

All Paris surface lines, comprising trolley cars and buses, went under the direct control of the municipal authorities on January 1st. The municipality is not running these lines itself, but is farming them out to an operating company, which is interested, to a certain extent, in the financial success of the concern. There will be no competition between electric trolley and gasoline omnibus lines, but cooperation between the two, each type being extended according to the requirements of traffic.

AMONG publications recently issued by the Director of the Air Service, Washington, are the following: Instructions for Installing 85-A Mixture Control in Zenith US-52 Carbureters, Performance Test of U.S.X. B.I.A. with 300 HP. Hispano-Suiza Engine and Performance Test of U.S.X.B.I.A. with 300 HP. Hispano-Suiza Engine Showing Improvement in Performance with Propeller X-19677.



Six-wheel motor bus now being experimented with in Paris. Front and rear steering give short turning radius



Rear axle on Paris bus is duplicate of front axle. Only the center axle has driving wheels

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Systems and Individual Development

AT a time when great emphasis is being given to systems and organization routines, it is well to recognize the fact that the multiplication of routine forms and systems inevitably results in a proportionate increase in overhead costs. There has been a tendency during recent years to reduce as far as possible the necessity for personal judgment and mental activity on the part of office workers; to establish rules and forms of procedure to so large an extent that the necessity for the exercise of intelligence on the part of the clerical worker is reduced to a minimum. This has been done on the principle that by such means the possibility of error is correspondingly reduced.

Looking at the matter from the opposite angle, however, it becomes evident that as the necessity for the exercise of intelligence on the part of the individual worker decreases, the necessity for supervision, both of the worker and the system increases. Or to state the same proposition in other words, as the intelligence of the individual worker is increased, the necessity for supervision is decreased.

In a recent editorial, the British journal, *Engineering Production*, says that "as a general proposition it may be stated that the Cinderella of commercial occupations is the clerical department. . . . The temptation to employers has been to replace efficiency with mere numbers—clerical labor being cheap—with the result that clerical staffs are frequently too large and unwieldy." This tendency is natural when overemphasis is placed upon systems, since more persons are always needed to operate the systems. The possibility of great gains accruing to the management through an attempt to increase personal development and to encourage the assuming of responsibility by individuals is worth serious thought.

It may take a little more time and effort to properly train and develop the individual in any given case so that he is capable of assuming a larger degree of responsibility for his personal efforts. But once accomplished the result is beneficial and permanent. Efforts to make system replace personal responsibility to a maximum degree result in trouble the moment the administration of the system lags. And even systems must be operated by human beings.

Physical Properties of Rubber

MANY people have wondered why the shock absorbers fitted to airplane landing gears should be made of rubber cord instead of steel. The great strength and elasticity of steel are well known, and it seems at first sight impossible that a material of comparatively low elastic limit like rubber could store a greater amount of energy in elastic deformation than the much stronger steel. Such, however, is the case, and the use of rubber for airplane shock absorbers is based on a sound principle. The amount of energy which a certain amount of a given material can store by elastic deformation depends upon both its elastic limit in tension and its elongation when the elastic limit in tension is reached, and this latter factor is, of course, much greater for rubber than for steel. The matter of the energy storing capacity by elastic deformation has been the subject of experimental investigation and it has been found that whereas tempered spring steel will store 95.3 ft. lb. per cu. in., vulcanized rubber will store 14,600 ft. lb. In view of this fact and the many endeavors in recent years to improve the riding qualities of automobiles it is a wonder that rubber has not been used for suspension purposes except in an indirect way.

Another peculiarity of rubber about which little is known is that it contracts when heated and expands when cooled, in which respect it differs from almost all other substances. In stretching rubber and allowing it to contract there is, moreover, a hysteresis effect. That is, the rubber does not exert the same tension during contraction as during extension while deformed the same amount. By plotting the curve of extensions and tensions for a complete cycle, a hysteresis loop is obtained, the area of which is a meas-

ure of the energy loss due to hysteresis. This hysteresis is one of the causes of heating in rubber tires and undoubtedly the chief cause in the case of solid tires. In pneumatics of the fabric type the heating is very largely due to the friction of one layer of fabric over another. Anything which decreases the hysteresis of rubber will improve the efficiency of tires from an energy conservation standpoint. It has been found that a slight overcuring has a beneficial effect in this respect, but, unfortunately, such overcuring is not good for the endurance of the rubber. It is readily conceivable that the fillers with which rubber is compounded have an influence on the hysteresis effect and thus influence the energy loss due to the tires.

Is Volumetric Efficiency of Prime Importance?

WHEN gasoline was cheap and the automobile was still regarded as a sporting vehicle or rich man's toy rather than the utility as we know it to-day, there were insistent demands for more power, with relatively little consideration for economy. Taxation, based largely upon engine size, and other factors then led, especially in Europe, to an effort to get the utmost power possible out of an engine of small bore. This, in turn, brought about many improvements in design intended to secure the maximum volumetric efficiency, and gave us in fact the modern high-speed passenger car engine.

To-day we still think in terms of maximum power, though economy in fuel is of quite as much, if not of greater, importance. It is generally conceded, in fact, that the average passenger car engine operates from 80 to 90 per cent of the time it is in use under loads of one-fifth to one-half maximum. In other words, we design for and talk about getting maximum volumetric efficiency and then proceed to use the engine thus designed under throttled conditions where, of course, the volumetric efficiency is purposely limited.

Every engine builder and car manufacturer can furnish from his files data on the full-load performance of his product, but few, indeed, appear to appreciate what a small fraction of the time the engine they build operates under full-load conditions, and fewer still have investigated the characteristics of the engine under light loads or appreciate how inefficient it then becomes, especially from a thermal standpoint.

As a matter of fact, there seems to be but slight appreciation of the truth that the engine which accelerates well and handles smoothly is not necessarily the more powerful; though the layman, if not the engineer, will often refer to such a car as being more powerful than one with a larger engine which in reality develops a greater maximum power when operated under the rare conditions which enable the potential power to be realized.

Much depends, of course, upon the manner in which the fuel is prepared prior to ignition in the engine. Of two engines identical, let us say, except in carbureter equipment and manifolding, including provision for heating the charge or the fuel, the one with the dryest or most readily combustible charge will give more satisfactory operation from the standpoint of acceleration and general handling and appear to be the more powerful, though it actually gives less maximum power when once it is wide open and the manifold cleared of fuel deposited on the walls. The first-mentioned engine will give far greater satisfaction in the hands of the user, and with rare exceptions will do all that the second engine will do under service conditions. Beside this, it will remain freer from carbon, will suffer less from fuel dilution of the lubricant, and probably travel much further per gallon of fuel consumed than the engine in which these desirable characteristics are sacrificed simply to secure a slightly greater maximum power.

In other words, the day when the utmost possible in volumetric efficiency was desirable regardless of other characteristics is past—perhaps it might better have never come. Some engineers still refuse to consider any vaporizing system which thoroughly heats the charge and thus decreases to some extent volumetric efficiency. With present-day fuels, at least, we feel that this is a serious mistake. Better by far sacrifice whatever relatively small amount of power is lost by heating the charge a sufficient amount and gain the benefits mentioned than sacrifice these for a slight gain in maximum power. It may even pay to use exhaust gas or some other diluent to prevent detonation with the hotter charge than to sacrifice the advantages gained. However this may be, let's forget the maximum power bugaboo, and aim, rather, to promote fuel economy and better performance under the average conditions of operation.

Ignorance Hurts as Much as Malice

LEGISLATION adverse to the interest of the automotive industry is not always designed with malice aforethought. It is often the result of ignorance of the true facts of the case on the part of legislators. This is illustrated by the New York City alderman who introduced an ordinance to compel all motor vehicles in that city to carry a rear-end signal device and so worded the ordinance as to exclude all except one signal on the market.

When other signal manufacturers protested, this alderman readily proposed an amendment so that other signals would be included. He said he really didn't know there were many different signals, and, having bought one of this particular kind and found it satisfactory, had molded the ordinance in accordance with its working.

This sort of thing provides ample justification for the efforts of automotive manufacturers to have the industry intelligently treated by legislative bodies, and emphasizes need for constant watchfulness.

It is undoubtedly true that ignorance of the real facts on the part of legislators can harm the industry fully as much as a conscious attempt to load it with burdens not properly its share. An honest attempt to get justice by the presentation of such facts has no relation to the pernicious lobby.

Credit Situation Improving Rapidly

Collections Easier, Parts Makers Find

Volume of Business Continues to Grow—Many New Orders Booked for Delivery

NEW YORK, April 26—Business in the automotive industry which began to forge ahead in January will show an improvement this month over last. The increase over March will not be so great, however, as it was in March compared with February. May remains something of a problem. Orders already on hand make it certain trade next month will approximate that for April, but whether it will continue to increase remains in doubt. There is a pronounced feeling that progress from now on will be slower than for the past quarter.

Conditions in the industry were discussed at a group credit meeting of the Motor and Accessory Manufacturers Association here to-day, and the experiences of the members showed a remarkable similarity.

The outstanding fact expressed is that collections are better than they have been since late last summer. Notes given last August are being paid and notes made more recently are being met, in most instances, upon the due dates. Cash has again made its appearance. Credit conditions are much easier than they have been in months. Collections showed considerable improvement last month, but the gain in April has been much more pronounced.

Old Orders Released

In general there has been a decided improvement among the parts manufacturers in the amount of new business, the number of releases on old orders, and in collections. Individual experiences differed somewhat, but the trend was all in the same direction. Additional passenger car companies are constantly coming into the market for supplies. The pulse of the truck end of the industry has begun to stir.

Parts and accessory manufacturers who depend on jobbers and retailers for a substantial share of their business reported that this trade is remarkably good and that it is now on virtually a normal basis. Orders are substantial and payments prompt. Jobbers and dealers seem to be doing a greater volume of business in proportion to the capital invested than the manufacturers of complete vehicles.

April has brought a very large number of releases on old orders and they have come from virtually all the passenger car companies, small as well as large. This indicates that the business recovery has filtered through the entire industry. Some of the companies mentioned were Haynes, Jordan, Grant, Hupp, Briscoe, Peerless, Stutz, Lincoln, Rolls-Royce, Cadillac, Kissel, Dodge, Oakland, Barley, Maibohm, and Studebaker.

Ford and Franklin seem to be leading in the list of companies offering new business. Others mentioned in this class included Chevrolet, Oakland, Wills-Lee, Lincoln, Chandler, Mercer, Hudson, Dodge and Hare's Motors.

Truck companies which have come into the market include International, Ruggles, Brockway and Acme.

Orders Held to Minimum

Complaint was general that passenger car companies are ordering on a strictly hand-to-mouth basis and that they expect deliveries before it is humanly possible to make them. Stock chasers have again taken the field. Parts makers have little idea of the future requirements of their customers and it is difficult for them to keep stocks of materials on hand to this reason.

One particularly gratifying statement in regard to collections was that they have shown marked improvement in the South, where they have been almost hopeless for months.

HAYNES PRODUCTION HIGHEST IN HISTORY

KOKOMO, IND., April 25—A. G. Seiberling, general manager of the Haynes Automobile Co., has issued a statement in which he says the company is producing 33 1/3 per cent more cars than ever before in its history and employing approximately 16 per cent more men than ever before. In many departments day and night shifts are being operated.

Auto-Lite Prepares for Rush

TOLEDO, April 25—The Electric Auto-Lite Co. announces that business prospects for May are 20 per cent better than for April. As a consequence the company is gradually taking on additional employees and now has approximately 750 on the payroll.

H. C. S. on Normal Basis

INDIANAPOLIS, April 25—The factory of the H. C. S. Motor Car Co., of which Harry C. Stutz is president, reports that production now is on a normal basis and that at no time has it gone below 60 per cent of normal.

France Sells Parts; Plan Dumping Here

Private Company Takes Over Camp from Government—Stocks Run to Millions

(By Cable to AUTOMOTIVE INDUSTRIES.)

PARIS, April 25—The first American reconstruction camp at Verneuil, the largest motor transport organization in France, has been sold for 55,000,000 francs ($11,000,000 normal exchange rates) to a private company with a government interest in the profits.

The camp contains few automobiles, but an immense stock of parts, including 9000 boxes of Ford parts and 45,000 solid tires.

It is intended to sell the parts on commercial lines and a large part of them will be reimported into the United States.

So far as is known, this is the first sale in France of American automobile parts which are likely to come into competition with home industries. A large number of motor trucks and passenger cars have been sold and reimportation of them has been begun. An American company also has bought up all the American army automobile tires left in France and tire dealers in New York and other places are suffering severely because of the competition from these tires.

It is such competition as this which could be made much less harmful if a clause were inserted in the anti-dumping bill which will be passed at the present session of Congress compelling payment of duty on the difference between the price at which these goods were purchased and the price in the open market here. Under the present law such goods are being reimported free of duty.

C. of C. HONORS INDUSTRY

INDIANAPOLIS, April 22—The automotive industries were given considerable recognition as a factor in the industrial life of this city when the committee appointments of the Indianapolis Chamber of Commerce were made public. Harry C. Stutz, head of the H. C. S. Co., and D. McCall White of the Lafayette Motors Corp. were named on the manufacturers' committee. John B. Orman, secretary of the Indianapolis Automobile Trade Association, was placed on the membership committee, while Walter C. Marmon was named on the reception and appreciation committee.

Willys Extends Factory Schedule

Outlines 450 a Day for May Production

Will Increase Working Force 30 Per Cent—Chrysler Reiterates Belief in Company

TOLEDO, April 23 — Following the greatest drive-away of motor cars in the history of the Willys-Overland Co., and a meeting of 600 dealers and bankers in five neighboring States with factory officials, John N. Willys announced that the company was planning to increase its working force by 30 per cent in May and its production by 50 per cent.

There are now approximately 6500 men at work at the Toledo plant turning out about 300 cars a day. This force will be increased to nearly 9000 next month.

In the great selling exhibition staged at the factory yesterday 525 cars were driven away.

Willys is brimful of optimism following his recent trips into the South and Western States. He is planning to visit New England, the Denver district and the Pacific Coast territory on his next sales trips.

The dealers were assured of the financial position of the company at the present time by the officials and received the word that no new models or change in the executive staff would be made.

Sales Manager A. C. Barber was in charge of the dinner meeting at the Willys-Overland administration building dining room. At the meeting there were addresses by President Willys, Executive Vice-President Walter P. Chrysler and Vice-President Charles B. Wilson.

Will Stand for Quality

Wilson declared that Overland was to stand for quality from now on and that a great effort was being put forth to build up pride of workmanship in the factory. He said every employee had signed the petitions headed:

"We are doing our best every day to make the Overland car a good investment."

"Our first problem following the after-the-war depression was to examine the cost of our car. If we are wasteful in the building of a car," declared Vice-President Wilson, "you can bet it is tacked onto the selling price. We want to deliver a car that is equal in quality to any in America. We have passed the old extravagant period of the war and are back to a real competitive basis now."

Chrysler said the executives had been troubled by the deflation of business and financial conditions but said they had them whipped now.

"I believe the Willys-Overland has arrived again," he declared. "And don't any of you salesmen tolerate the statement that the automobile business is depleting itself. To-day it's the barometer of the business world. A few years ago steel measured business, but to-day the automobile and its accessories is the dominating feature of business. It has staged the comeback first and is now employing great forces of money, resources, and men.

"Our new President has placed the automobile into his first message to Congress because he realizes that transportation is the heart of business.

"I want to disperse these rumors, too. The very closest relation that can exist between two men characterizes the relation between John N. Willys and myself. And it's going to exist. I am here to make a success of this business.

Out For Clean Business

"We are out for clean business, a better product, and plain common sense."

Willys told the dealers that financially the company was gaining every day. He said economy had been built into the new organization, that he wasn't broke and confirmed what others had said about no change in personnel of executives.

"The last six months have been very troublesome," he declared. "We have learned many lessons. One which I have

(*Continued on page* 934)

Financial Worries Over, Willys Declares; Has $7,000,000 Cash and Surplus Sold

TOLEDO, April 22—President John N. Willys said today that great accomplishments had been made financially by the Willys-Overland Co. in the last few months.

He said the Executive Vice President Walter P. Chrysler had managed to cut overhead expenses so as to save $4,000,000 annually to the company.

"Our assets at the present time are $135,000,000," he reported. "A year ago we owed to bankers approximately $46,000,000 and they thought we were in good shape. Last fall we were owing more than half that and they thought we were broke. But now we have reduced to $21,000,000. They have said they will carry us until Nov. 1.

"We have liquidated our stocks. We have $7,000,000 in cash on hand now.

"Our floating loans and accounts payable during 1920 have been cut $13,000,000.

"We can face the future with optimism without departing from conservatism.

"Our business for many weeks has shown a steady, and now shows a rapid, improvement.

"Distributors' and dealers' inventories—nearly 6,000 in number—are in better condition than they have been for years."

Walter P. Chrysler reported that commitments for materials totalling $105,000,000 at the beginning of the depression had been reduced to $15,000,000 during the strenuous period of falling prices.

A. C. Barber, sales manager, reported that the sales incident to the drive-away yesterday in which 525 cars went out had brought in $545,180 in cash to the treasurer's office this week.

Car Tariffs Yield $786,628.75 in 1920

WASHINGTON, April 25—Duties on imported automotive products during the calendar year of 1920 amounted to $786,628.75 according to the statistical report completed this week by the Bureau of Foreign and Domestic Commerce. It is particularly important at this time because of the pending fight on tariff matters. The report shows that 30 per cent tax levied on 811 automobiles valued at less than $2000 each amounted to $197,992.50. Forty-five per cent assessed on 93 cars valued at $2000 or over brought $133,842.60 into the Federal Treasury. The same rate applying on 380 imported bodies amounted to $36,628 in duties. With the 30 per cent rate of duty applying on 240 chassis, $256,546.80 was yielded, and on other finished parts, not including tires, $71,499.30.

The reciprocity agreement with Cuba brought only $108 into the Federal Treasury on these items.

Few Motorcycles Imported

With the 25 per cent rate applying on motorcycles, the Government obtained $1992.75 in duties and $1875.25 on other unfinished parts of motorcycles, not including tires.

Levying 20 per cent on 78 airplanes imported into this country brought $35,605.60. The same rate applying on metal parts of airplanes yielded $29,250.

Tariff Main Topic at U. S. C. C. Meeting

Industry Represented by Eight Organizations at Convention—Outline Business Plans

ATLANTIC CITY, April 26—The automotive industry is well represented at the annual meeting of the Chamber of Commerce of the United States which opens here to-night. The following organizations are entitled to delegates at the convention:

National Association of Automotive Mutual Insurance Companies, New York.
National Automobile Chamber of Commerce, New York.
National Automobile Dealers Association, St. Louis.
National Automobile Underwriters, New York.
National Association of Collapsible Tube Manufacturers, Chester, Pa.
Automotive Equipment Association, Chicago.
Motor and Accessory Manufacturers Association, New York.
Automotive Wood Wheel Manufacturers Association, Chicago.

In addition to the official delegates many leaders in the industry have come here to listen to the discussions. The general theme of the convention will be, "More business methods in government; less government management of business." The most important questions to be discussed are tariff, taxation and foreign trade.

In the discussion of the tariff, four questions will be considered. They are:

1—Should the tariff not be framed with due regard to export trade sales or for the protection of manufacturing in the United States?

2—Should the fact that the United States now is a creditor nation alter the American tariff policy with respect to protection?

3—Should the United States tariff offer trading or bargaining possibilities for international commercial treaties to encourage export trade?

4—Should the United States tariff be liberal in its provisions in view of the American desire for liberality of tariff on the part of other countries?

Other subjects of interest to the automotive industry will be:

Adjustment of laws relating to foreign trade so as to give merchants and firms a competitive opportunity with the nationals of other countries.

Discuss Highway Commission

Creation of a Federal highway commission to lay out and direct construction and maintenance of an interstate system of highways.

Modification, amendment or repeal of all legislation that restricts the operation of natural economic laws.

Reduction of freight rates if it can be done without impairing railroad credit or efficiency.

Readjustment of wages, valuation, cost of production and the cost of living.

Preparation of legislation calling for an aeronautical code and the necessary machinery for its enforcement.

C. C. Hanch, chairman of the tax committee of the National Automobile Chamber of Commerce, will present the tax program of that organization upon which virtually the entire industry is standing. The delegates to the convention will be asked to vote on whether there should be an increase in the income tax, a sales tax or a resort to loans.

J. Walter Drake, chairman of the foreign trade committee of the N. A. C. C., will present a resolution calling for retaliatory action of the United States against countries which impose discriminatory tariffs.

Highway Plans to Get Attention of Congress

WASHINGTON, April 25—"Concentration of Federal aid money upon the most important State roads which have an interstate character is the next logical step in co-operation with the several States in highways improvement," is the assertion of Senator Charles E. Townsend, chairman of the Senate Committee on Post Offices and Post Roads.

"That Congress undoubtedly will give comprehensive attention to the good roads subject in the present session is predicted by the quite exact reference set forth in President Harding's message. That the Federal agency of administration should be elevated to the importance and vested with authority comparable to the work before it is a proposition which is certain to meet with general approval from those who have truly at heart consistent good roads progress.

"Highways now concern five branches of our government, and there should be a distinct authority which can deal with all departments and possess an independence of procedure. No longer can this work be accomplished effectively through the bureau of a single department. Transportation is the life of the nation, and travelable highways facilitate the daily activities of millions of American families."

PROPOSE NEW AIR LINE

INDIANAPOLIS, April 22—The city council has promised J. C. Wright of Pittsburgh to co-operate in a plan for "the establishment of an aerial mail route from Washington to Chicago. Cities proposed for the route are Cumberland, Md.; Pittsburgh, Columbus, Dayton, Indianapolis and Chicago. The plan is proposed to have one mail plane start from each end of the route at 7 a.m. daily, and said to be possible to reduce by 14 hours the present mail time between cities on the route.

CLIFTON DINES DIRECTORS

NEW YORK, April 22—Col. Charles E. Clifton, president of the National Automobile Chamber of Commerce, gave his annual dinner to the directors of that organization at the Biltmore last night. The affair was very informal and there was a general discussion of the problems confronting the industry.

Industry to Push Foreign Trade Plans

N. A. C. C. Committee Will Be Named This Week to Co-operate with Hoover

NEW YORK, April 23—The special committee of the National Automobile Chamber of Commerce, which will co-operate with the Department of Commerce in devising plans for effective promotion of foreign trade in American-made motor vehicles, probably will be appointed this week. The co-operation will result in two kinds of foreign-trade service—promotive and intelligence.

Before starting promotive work for the sale of motor vehicles, the committee will confer with experts of the Bureau of Foreign and Domestic Commerce familiar with the countries in which the campaign is to be launched. Through these conferences the promotive work could be made to conform with the actual requirements of the various countries.

The intelligence service is to consist of world-wide inquiry to ascertain foreign demand and the collation of specific trade information. This service would enable the manufacturer to decide on a broad foreign-trade policy. The N. A. C. C. committee will decide what specific information is essential to the American manufacturers, and when this information is obtained it will be distributed among American motor vehicle manufacturers.

J. Walter Drake, chairman of the foreign-trade committee of the N. A. C. C., believes that this co-operative arrangement will be advantageous not only to the automotive industry but also in the solution of general problems of the United States export trade.

Secretary of Commerce Hoover has requested an additional appropriation of $250,000 "for promoting commerce." He would establish twelve new divisions to cover various commodities. One of the twelve would be automobiles and accessories.

The plan of Hoover is to have two experts on each industry, who will alternate in the field and serve in the bureau at Washington. These industrial divisions would pass on commercial problems of the trade connected with foreign commerce, utilizing the mass of foreign-trade information now available for the industry, and keeping up to date the market investigations undertaken during the last five years.

TO BUILD $1,200 SPORT PLANE

SEYMOUR, IND., April 22—Assembly of aircraft and the training of pilots will be started here by the Western Airline Syndicate, which has leased a three-floor building and 25 acres of ground. The company is capitalized for a quarter of a million dollars. The big production will be devoted to a light sport plane selling for $1,200.

Bethlehem Receiver to Sell Off Trucks

Sale of Pottstown Plant Held Up for Time—336 Vehicles to Go

PHILADELPHIA, April 22—On petition of Clinton E. Woods, receiver for the Bethlehem Motors Corp., asking instructions from the court, Judge Thompson, in United States District Court of the eastern district of Pennsylvania, this afternoon issued a decree granting the receiver authority to sell the completed trucks on hand and in the field, amounting to some three hundred and thirty-six vehicles at the Allentown, Pa., plant of the company and elsewhere, at private sale at prices he deems desirable, and also to sell under similar circumstances such excess inventory at the Allentown and the Pottstown plants not necessary for the maintenance of the service station.

This application of Receiver Woods to the court was in the receivership in equity case of William G. Keck, trading as Keck Bros. & Co., complainant, vs. the Bethlehem Motors Corporation and followed a meeting of a majority of the creditors and their counsel yesterday at the Allentown factory of the company. At this meeting resolutions were passed that Receiver Woods apply for the authority from the court not only to sell the trucks and the excess inventory, but also to sell the Pottstown plant, devoted to the manufacture of the engines, including the real estate, machinery and equipment.

The creditors' committees at this meeting represented both the banker creditors and the merchandise creditors. Creditors' counsel at to-day's session in court showed for one group, however, that it would not be advisable at this time to sell the Pottstown plant, and no decree was granted in this respect. The bankers' committee of creditors represents the larger claims, aggregating about $1,700,000.

It was shown at the creditors' meeting on Thursday that should the Pottstown plant be sold the Allentown factory, where the frames, springs, chassis and bodies are produced, could be operated by the receiver at approximately $6,000 to $7,000 a month, instead of from $12,000 to $13,000 as at present. It is regarded by some of the creditors as probable that application will be made later for a decree to sell the Pottstown plant. The Allentown factory will continue to operate for the present.

MADISON FAILS OF SALE

ANDERSON, April 22—Auctioning of the effects of the Madison Motors Corp. produced little interest. One bid of $34,000 was received for the factory. It was not accepted. The building and eight acres of land are appraised by the receiver at $70,000. Automobiles and automobile parts and supplies sold out readily enough at prices fixed on condition and age.

The Madison Motors Corp. quit business several years ago. It was organized by Cecil Gibson, organizer of the Gibson company, state distributer for the Overland line. Gibson no longer is connected with the company. Fred C. Dickson, receiver for the Madison Motors Corp., is in Wisconsin, and at his office no announcement was obtainable as to winding up affairs following this sale.

Passenger Cars Share Truck Fee Increases

HARRISBURG, PA., April 21—Objections made by motor truck interests in the State and such organizations as the Philadelphia Chamber of Commerce, apparently have caused the State Highway Department to agree to several important changes in the Buckman bill seeking to regulate motor traffic and which the department hitherto has been supporting.

Reducing the proposed increases with respect to trucks and raising the fee for passenger cars from forty to fifty cents per horsepower is suggested. It is understood that present truck fees will, however, be raised by about one-half their present rate. The original increase contemplated was all the way from 80 per cent to 200 per cent. Paul C. Wolff, Pittsburgh, representing, as secretary, the Pennsylvania Motor Federation, opposed the change in lighting regulations embodied in the bill.

The new light standards had been suggested by the Illumination Engineers' Society of the United States. The department plans to establish light testing stations throughout the State. It is reported that comparatively few of the present lights meet the legal standard.

Texas Tractor Sales Placed at $6,000,000

DALLAS, TEXAS, April 23—More than 3000 power tractors for farm and road use are being distributed to users in Texas by the twenty implement dealers in Dallas, according to estimates of men who keep closely in touch with the tractor trade here. The average value of those tractors is $2000 one of the implement men said, which makes a total of $6,000,000 for the tractor business in the State for the year.

LUBRICATING OILS REDUCED

NEW YORK, April 23—The Vacuum Oil Co. has announced a substantial reduction in the prices of its lubricating oils of all grades and in all size packages. The reductions range from $5 to $10 a barrel and from 10 to 30 cents a gal. in cans. The company reduced its prices as of April 20 to give its dealers who had price guarantees to May 1 on carload or other large quantities, protection against loss covering the unsold portion of such shipments remaining on hand. A refund will be made to all such customers of the net difference between the prices.

Mississippi Growth to Come with Trucks

Valley Association Gives Highway Transportation Important Part in Convention

NEW ORLEANS, April 25—The big outstanding feature of all the six great public conferences which will make up the annual convention of the Mississippi Valley Association at New Orleans, May 2, 3 and 4 this year, will be transportation, and the leading subject of discussion will be motor truck transportation in the Mississippi Valley, and how it can be made to coordinate and cooperate with water transportation, and, through the inland waterways, with deep-sea transportation out of the ports of the valley.

The first and largest of these conferences will be on highway-water-rail transportation; the second will be on agricultural transportation, highway building for motor trucks, thereby to give the farmer closer connection with his home market, and, through long-distance transportation, with foreign markets; the third will be on reclamation and conservation, with a large part of it devoted to highways and to motor truck lines and the parts they play in the reclamation of lands and the conservation of resources; the fourth will deal with the development of new trade routes, primarily at sea, but secondarily, in their connection with trade routes by highway, water and rail in the Mississippi Valley.

The employment of labor by the state in building highways and in keeping in repair those already constructed, will occupy a large part of the interest in the fifth public conference, and the sixth will deal with foreign trade, especially in connection with the exports of articles manufactured in the Mississippi Valley.

Probably never in the history of a convention of this kind has the automotive vehicle figured so largely. Delegates from 30 states of the Union and from 27 foreign countries, largely Latin-American, have made reservations for the convention, the call for which was sent to more than 10,000 firms, corporations, companies and individuals in the United States alone.

Export Financing Important

The question of the financing of exports from gulf ports, to which inland waterway transportation is now fairly well organized, will be taken up. This has been the great obstacle to the export of automobiles, trucks and tractors, manufactured in the Mississippi Valley, through the gulf ports, and the results of the conference should be of vital interest to every automobile manufacturer and distributor in the upper Valley, since water transportation from those manufacturing centers to the gulf ports is now lower than rail transportation to these or to any other ports in this country.

President an Ally; Will Keep Him So

Graham Tells Philadelphia Truck Association of Harding's Interest in Welfare

PHILADELPHIA, April 22—Members of the Motor Truck Association of Philadelphia listened to messages of unusual importance from men high in the industry when they gathered at the Hotel Adelphia for the April meeting. They heard George M. Graham, vice-president of the Pierce Arrow Motor Car Co., tell how, in an interview, President Harding had expressed deep interest in the problems of the overtaxed industry and showed that he is an ally of the business and will be kept so. They listened to R. E. Chamberlain, assistant general manager of the Packard Motor Car Co., discuss "What An Ideal Dealer Should Be," and they were entertained and interested by the address of J. D. Eggleston, motor transportation engineer of the Paige Motor Car Co., on "Analyzing Motor Transportation."

In his topic, "Making the 1921 Grade," Graham said in part:

"The speed already developed in the motor car business, especially considering past conditions, entitles the industry to be optimistic for the future. As to present business conditions, I blame the manufacturer for the slump we experienced on account of his over-optimism; for too great and rapid expansion and for not protecting his own credit and that of his dealer. But his revenue went to his partner, good old Uncle Sam, by way of the revenue bill, which took away most of his profits.

"Nevertheless, he has gone along pretty well. Throughout the war conditions were pretty difficult—what with restrictive legislation and being eliminated from foreign business.

"But conditions are changing. . . . I was one of a committee to see President Harding recently. He was interested in our problems and what we want and can do. We called his attention to the need of regulation of license fees of all States, to keep roads in repair, but not to build new roads.

Industry Needs Credit

"We told him our industry needs credit and we pointed out our export conditions. I pointed out that two-thirds of the motor vehicles, or in excess of 6,000,000 cars, are owned in homes where the yearly income is $4000 or less. Yet this is the most over-taxed industry existing and is one of the few with a sales tax. No such tax is imposed on steamships or locomotives. Mr. Harding used the phrase that the motor car is a 'purveyor of transportation.' We found him an ally and will keep him so."

In outlining the qualities of an ideal dealer, Chamberlain asserted that everyone in the automobile business was at fault for his own difficulties, adding that salesmen have not kept up to the mark and will have to correct this attitude. Retail establishments, he continued, for the most part are not as strong financially as they should be, but are stronger than they were a year ago.

After reviewing causes and conditions of the business hesitancy, Chamberlain said that the truck industry had been hit harder than the passenger car business, but that he considered both fundamentally sound. He added that the average truck dealer is not as good a business man as the average merchant.

He told of methods used by the Packard company which gave the factory an index of where distributors were lax.

Bonus Leading Factor in Deciding Taxation

WASHINGTON, April 26—Because Senator Penrose, chairman of Senate Finance Committee in conference with the Taxation Committee of the National Automobile Chamber of Commerce stressed the fact that the bonus legislation held the key to the tax problem of the automotive industry, it is significant to note that the National Industrial Council has opposed the proposed plans for monetary rewards to soldiers. The Council has distributed an analysis of the schemes and pointed out their effect on the nation's tax bill. Senator Penrose directed attention of the automotive industry to the need of retaining various methods of imposts if the bonus bill was enacted.

Two proposals are now before the Congress, known as the Fordney and McCumber bills. It is proposed to defer the execution of the plan until Jan. 1, 1923, but it will be necessary to make arrangements for a levy immediately. The McCumber bill offers five separate plans of which No. 1 and No. 2 are more or less acceptable to Senate leaders. The cash payments under the first plan are to be spread in quarterly installments over a period of two years or, in Plan No. 2, over twenty years in loans less repayments, or on account of deaths, or the maturity of what is for all practical purposes an endowment insurance.

If every veteran accepts the cash plan, it will cost the taxpayers $1,547,904,395. Should every veteran accept the certificate plan, with no borrowings, and making allowance for annual payment on account of debts, the total amounts in 1943 would aggregate $5,251,364,907. The other three plans range in total payments from three to four billion dollars.

RACING ASSOCIATION FORMED

PHILADELPHIA, April 22—The National Motor Racing Association, an enlargement of the Philadelphia Motor Racing Association, has been incorporated under the laws of Delaware and will stage races throughout the Middle Atlantic States during the season of 1921. The association now has approximately 70 members, including automobile, motorcycle, airplane drivers and motor boat pilots.

Good Quotes "Luxury" in Reply to Dealers

Says Cars Not Necessity in Dictionary Sense—Dealers Quote Harding's Message

CEDAR RAPIDS, Iowa, April 22—Despite a storm of protesting letters against his proposal of a wheel tax designed to collect $200,000,000 from owners of passenger carrying automobiles, Congressman James W. Good has reaffirmed his opinion to the Linn County Motor Trades Bureau that that form of vehicle is a luxury.

"Webster defines the word necessity as a thing that is indispensable and certainly no sane person will contend that he cannot live without an automobile," says a letter to the automotive men of Good's home town. "In talking with highway commissioners in Washington at present, I find there is substantial agreement on their part that Federal aid for highways should continue and that the money necessary should come from an additional tax on automobiles. Nothing will stimulate the industry more than good roads. I cannot think of a more just tax to aid in road building than to tax the automobiles that use the roads."

The Linn County Motor Trades Bureau lost no time in replying to Congressman Good's letter, taking particular exception to his use of the word "necessity." It pointed out that President Harding in his message to Congress on April 12, said "the motor car has become an indispensable instrument in our political, social and industrial life." The Cedar Rapids dealers further emphasized the fact that the automobile industry is now the most taxed of the five main levies through income taxes, sales taxes, taxes on repair parts, State license and registration fees, scattering municipal and personal property taxes.

"We take the stand that all businesses should be taxed on the same basis and even now the automobile is the target of special levies both national and State," says the letter. "Now you propose on top of these five main levies to add another excessive burden to the automobile industry. We say quite frankly we believe you should give this further consideration."

OBENBERGER FILES SCHEDULES

MILWAUKEE, April 23—Liabilities of $858,972.79 are admitted and assets of $1,778,329.13 are claimed in the schedules filed by the John Obenberger Forge Co. of Milwaukee in bankruptcy court to-day. An involuntary petition was filed against the corporation on March 25 with the consent of the company, which has been in charge of a creditors' committee since December. The first meeting of creditors will be held May 2, at 10 a.m., in the government building here. J. F. Gerdis is receiver.

N. I. V. A. Establishes Farm Power Bureau

Will Combat Anti-Tractor Propaganda Through Publicity—Propose Federal Tests

CHICAGO, April 23—While the reports of actual business in hand now were not encouraging and manufacturers' representatives were reluctant to make any predictions of what the future would bring forth or when there would be a renewal of buying, a spirit of optimism pervaded the spring convention of the Tractor & Thresher Department of the National Implement & Vehicle Association held in this city yesterday. Most of the tractor manufacturers were represented.

No one was quite happy over conditions as they stand, but there have been a number of factors entering into the situation, principal among them being that of transportation and freight rates. Too, the mental attitude of the farmer has figured largely and whether the realization that the winter wheat crop —the first to be harvested, will be a bumper one and will cause a change of outlook, was a matter largely of conjecture. As yet, the farmer, sensing the importance of the approaching crop, has shown no disposition to come into the market.

Temporarily the buying power of the farmer has been destroyed. Unable to dispose of his crops or his cattle at a profit, from the standpoint of his expenditures, he is practicing the utmost rigid economy along all lines. Little blame was attached to the country banker for credit refusal with conditions as they are to-day. There is no need, according to the expressed opinions, to sell him on the tractor idea, for he is already sold. But he has no money to lend to finance tractor sales or any other kind of sales. In a recent survey of conditions among eighty-five banks in Central Illinois the fact developed that whereas a year ago the banks had on deposit $2,000,000, this year the deposits had dwindled to $430,000 and borrowings by the banks were approximating $2,300,000.

Farmer Attitude General

The situation in Kansas may be taken as indicative of the general attitude of the farmer. Despite the fact that the crops there promise to meet every anticipation and more and despite heavy rainfalls which have been experienced in that section, the farmer remains in a lethargic state of mind. He is not affected, and has not relaxed his position to the extent of coming into town to buy farm machinery.

Little was said at the meeting of means to meet the situation or of steps to remedy it unless it be in the statement of Finley J. Mount, the chairman of the department, who urged less talk and more hard work, or in the statement of other manufacturers that salesmen must become salesmen again and relinquish the position of mere travelers.

To cope with the misrepresentation by interests opposed to the tractor industry that has been made, and to present correct information to the farmer, to agricultural colleges and others through farm papers, country weeklies and other mediums, the association has established the Power Farming Bureau with headquarters in this city and it is felt that this department will do much toward setting the doubting farmer right when the time comes for him to invest in farm machinery. This department received the hearty co-operation of the manufacturers representatives present at the meeting.

At least one tractor demonstration will be held this year, the time and place to

(*Continued on page* 934)

N.A.D.A. to Get Hearing on New Revenue Bill

WASHINGTON, April 23—Notification was given to C. A. Vane, general counsel of the National Automobile Dealers' Association, that the organization's request for a formal hearing on the revenue bill had been granted. The notification was from Senator Boise Penrose of Pennsylvania, chairman of the Senate committee on finance.

Dates for the hearing will be announced later. It is the intention of the Senate committee to take up a number of general revenue propositions in connection with the new fiscal program and thence to proceed to the direct question of taxes and discuss the revenue law of 1918 section by section under the general titles of the former act.

Vane is now studying the tax situation here and will make a report to the directors of the N. A. D. A. at the meeting in Detroit, May 9. At that time the directors will determine whether the executive committee of the association will appear before the Senate committee, whether the entire board will go before or whether a number of the leading distributors of the country will be asked to go to Washington and present the tax case from the dealer's standpoint.

TIMKEN RESUMES OPERATIONS

COLUMBUS, April 23—The Columbus branch of the Timken Roller Bearing Co. started operations April 20 after a shutdown since October. Word was received by Charles N. Replogle, manager, to start operations in the screw, machine, grinding and inspection departments, and about 250 men were put at work. It is hoped to increase the number gradually to about 2500.

PILOT INCREASES FORCE

INDIANAPOLIS, April 23—Pilot Motor Car Co. has increased its working force 50 per cent during the past week. Orders are coming in in fair shape, according to Superintendent Van Etten, but in spite of a supposed surplus of labor, the company is finding it difficult to secure high class skilled labor.

Studebaker Control Not to Be Changed

Erskine Denies Schwab and Durant to Enter Board—Business at Best

NEW YORK, April 26—The fact that Charles M. Schwab and W. C. Durant recently have been heavy purchasers of stock in the Studebaker Corp. has given rise to renewed reports in financial circles that they are to become directors of the South Bend company. It is denied by both of them, however. President Erskine of Studebaker announced at the annual stockholders meeting that no changes in the management of the company were impending.

Studebaker stock continues its spectacular course on the stock exchange and is fluctuating between 86 and 89. Much of the movement in it is believed to be purely speculative, although the company is doing the best business in its history and is shipping cars at the rate of more than 7000 a month. Net profits for the first quarter of the year are estimated at more than $1,000,000 after taxes, and for the second quarter they are expected to greatly exceed this amount.

Another report in regard to Durant is that he has been buying into Continental Motors. This was said to be responsible for recent heavy purchases of stock in that company. Officers of Continental Motors declared, however, that there is no basis for this rumor, although the company is submitting estimates and doing considerable work on the motor for Durant's new car.

Reports that Walter Flanders soon would join the Durant organization also were denied at Durant's office here.

CAMPBELL RESIGNS COMET

KANSAS CITY, April 25—Robert H. Campbell has resigned as vice-president of the Comet Automobile Co. of Decatur, Ill., to become vice-president and production manager of the Farmers Mfg. Co., which has taken over the business of the Coleman Tractor Co. of this city. The new corporation intends to continue production of the Coleman tractor which will be redesigned. Officers of the company in addition to Campbell are: President and general manager, Frank Hamilton; vice-president, O. M. King; secretary and treasurer, James E. Dunn.

COLLINS DEFERS RETIREMENT

DETROIT, April 26—R, H. Collins, whose impending retirement from the General Motors organization was announced last week, has decided to remain as president of the Cadillac Motor Car Co. for the next few months. He undoubtedly will stay until the Cadillac company is settled in its new plant. Collins tendered his resignation to President DuPont of General Motors last January, but it has not been acted upon.

Minnesota Business Returns in Cities

Country Districts Out of Running Until New Crop—Trucks Good

MINNEAPOLIS, April 25—Week by week the automobile dealers are showing that business is on the gain. The returning prosperity is evident on the floors of most of the city agencies and branches. However, this business is largely from the cities of the State. The country districts are still out of the running so far as orders go. The money situation has not improved enough to allow the rural dealers to handle cars extensively.

A branch manager who has returned from the Cuyuna iron range reports that the automobile business is extra good in that part of Minnesota. This trade also is in the towns and cities. The truck business continues good with contractors who require more transportation facilities for jobs that are being let for road work and other construction activities.

Part of a résumé by the Northwestern National Bank reads: "We have a legacy of debts from the old year to contend with; bank reserves are frequently low, particularly in small country banks which depend exclusively upon a farmer clientèle; loans are apt to be of a size out of proportion to deposits. Although the accommodations given to member banks are still at a high point, the trend of late has been fairly encouraging, the total on March 31 amounted to $60,892,000 as compared with $58,184,000 a year ago, and $14,346.000 on March 31, 1919, at which latter date liquidation was moving along in a manner more nearly normal.

"Liquidation will continue gradually during the next few months. It is reasonably certain, however, that in lines of business which depend primarily upon the grain farmers, and in communities where credit has reached the dead line, there will be a lull until new money comes in. The varying conditions in the different sections are to be discerned in the shades of expression to be found in reports made to this bank. 'It is going to be tough until fall,' 'There will be no material change until we get a crop,' 'We cannot look for improvement until we get a crop!' "

FORD FLOUR MEETS DEMAND

DETROIT, April 22—Wheat raised on the Henry Ford farm in Dearborn and ground in the Dearborn Ford flour mill, now is being sold in the Ford stores at Highland Park, River Rouge and Dearborn. The flour is sold in 25 pound bags labelled Ford flour, and sells for $1.19 a bag.

The Ford mill at Dearborn, which was completed last fall, is one of the most modern in the country. It is located directly alongside of the Ford grain elevator where grain from the Ford farm is stored and cleaned. The mill is operating on such a basis as to supply the stores as fast as the flour is being sold. The wheat grown on the Ford farm is handled exclusively by Ford machinery and equipment. The ground is plowed and the wheat cut by Fordson tractors, and the grain hauled to the mill in Ford trucks.

Battery Companies Find Trade Outlook Improved

CAMDEN, N. J., April 23—Announcement was made by President Lloyd at the annual meeting of stockholders of the Electric Storage Battery Co. and the Willard Storage Battery Co. that since March 1 there has been a marked improvement in business and that the future looks promising. The new plants at Crescentville, which will cost in the neighborhood of $2,000,000, are nearing completion.

President Lloyd declined the request of the stockholders for information on the gross sales of the company. He said it would be unwise and against the best interests of the company to make the figures public. This stand was indorsed by the stockholders.

Lloyd said that an investment of nearly $1,000.000 recently had been made in the English Battery Co. All the directors were re-elected and the annual report was approved.

Propose Car Training in Indiana Schools

INDIANAPOLIS, April 22—Suggestions that the Indiana State Board of Education consider the needs of the automotive industry in trained automotive engineers, highway engineers, transport engineers and educated mechanics have been made to Elwood Haynes, of the Haynes Automobile Co., recently appointed to the Board of Education by Governor McCray.

The Indiana Automotive Trade Association, through its president, N. H. Cartinhour, appealed to Haynes, that as far as possible and as far as compatible with the best general interests of education, that courses of study in Indiana schools be broadened to permit the training of men for the automotive industry. Haynes, in answer to Cartinhour, pledges his "support of such an education as will conserve the best interests of the State," adding that the work is so new to him that he is uncertain of what its policies may be.

UNITED CUTS BODY PRICES

CLEVELAND, April 23—The United Automotive Body Co. has announced a reduction in prices ranging from 10 per cent to 25 per cent on all its Ford commercial and passenger bodies. The company has opened additional branch assembly plants at Detroit and Pontiac, Mich., to serve more efficiently the sales organizations of motor truck manufacturers located in these cities.

Motor Truck Sales Increase in Texas

Diversification of Use Brings New Demand—Freight Lines Buy Equipment

DALLAS, TEX., April 23—During the past two months 200 motor trucks ranging in value from $1000 to $6000, and most of them in the $2000 to $4000 class, have been sold and delivered by dealers in Dallas or through them. This, despite the period of depression, the dealers believe, is an indication that the motor truck has firmly entrenched itself in the minds of the industrial and agricultural world.

Of the total number sold during the past two months one third of them were delivered in the immediate Dallas territory and quite a few of them went to farmers who are using them in getting produce, butter and eggs to the city, cotton to the gins, wheat to the mills and corn to the cribs.

From Dallas quite a number of trucks find their way to the cattle country. Ranchers use them with trailers for hauling a car load of hay at a time from the railroad to the ranches, sometime seventy-five miles away. They use them for hauling calves and even cattle, alive to the railroads.

The Dallas dealers report also that many of the motor freight lines in the thickly settled sections of the state, are buying new trucks for handling increased business. They are also finding that many counties which have not already done away with horses and mules for the purpose of hauling road materials, bridge materials, and doing other things, are getting the motor truck habit along with the motor road building habit. In addition to these things the usual number of manufacturers and merchants are buying trucks for their delivery and other business.

Sales of passenger cars are picking up considerably, the show here performing an important part in restoring demand.

MULLINS TO STAY IN SALEM

DETROIT, April 22—Reports that the Mullins Body Co., Salem, Ohio, which has been beset by labor troubles, would move to Detroit, were confirmed in part to-day by company officials, though it was said labor troubles in Salem were nearing adjustment and in all probability the situation would be overcome and the plant would remain in that city. Officials said, however, arrangements had been made for plant space in Detroit, and for shipping machinery and equipment to Detroit by express on short notice when the trouble became acute a few days ago.

While the labor situation has not cleared entirely and the company still is in position to move to Detroit quickly, it was said there was every indication in Salem to-day that such a radical step would not be necessary.

Townsend Submits New Highway Bill

Embodies Features Recommended by Harding and Indorsed by Automotive Bodies

WASHINGTON, April 26 — Senator Townsend, chairman of the Senate Committee on Post Office and Post Roads, has prepared a new highway bill after conference with organizations interested in highway development, which emphasizes practically all good roads features recommended by President Harding in his recent message to the Congress. The measure will be presented to the Senate late this week when the drafts are completed. The legislation represents the compromise of principles and methods, but it is regarded as the most acceptable at this time and one calculated to pass without formidable opposition.

The Senate bill contains many of the important features of the original Townsend bill, which was indorsed by the National Automobile Chamber of Commerce, the National Automobile Dealers Association, the Federal Highway Council and kindred organizations. The new draft creates the Federal Highway Commission, continues Federal aid to states with drastic maintenance clauses and other marked revisions intended to abolish abuse in the distribution of Federal funds.

The $100,000,000 fund which is appropriated for Federal aid each year is continued for two years, but provisions have been inserted which restrict the distribution of the money. Not more than 3 per cent is to be expended for the administration of the Federal Highway Act for carrying on necessary highway research and investigational studies independently of any co-operation with the State Highway Departments and other research agencies. It is provided that the commission shall, after making these deductions, apportion the remainder of the appropriation for each fiscal year among the states as follows:

Basis of Ratios Changed

"One-third in the ratio which the area of each state bears to the total area of all the states; one-third in the ratio which the population of each state bears to the total population of all the states, as shown by the latest available Federal census; one-third in the ratio which the mileage of rural delivery routes and star routes in each state bears to the total mileage of rural delivery and star routes in all the states, at the close of the next preceding fiscal year, as shown by certificates of the Postmaster General, which he is directed to make and furnish annually to the commission. Provided, That no state shall receive less than one-half of one per cent of each year's allotment. And, Provided Further, any amount apportioned under the provisions of this Act unexpended at the end of the period during which it is available for expenditure under the terms of this section shall be reapportioned, within sixty days thereafter, to all the states in the same manner and on the same basis."

The bill further provides: "That the commission shall establish an interstate system of highways, composed of primary interstate roads which shall, by the most practical routes and with due consideration for the agricultural, commercial, postal and military needs of the nation, afford ingress into and egress from each state and the District of Columbia. Such interstate system may include highways to and from important water ports, and highways connecting at the border with the main highways in countries adjoining the United States; but shall not include any highway in a municipality having a population, as shown by the latest available Federal census, of five thousand or more, except that portion of any such highway along which, within a distance of one mile, the houses average more than two hundred feet apart.

Must Provide Maintenance

In order to carry out the recommendations of the President, the Senate Committee has inserted a proviso to the effect that no project shall be approved by the commission in any state until the state has made adequate provision for the maintenance of the highway selected by the commission in that state. It will be noted that this provision fulfills the suggestion of President Harding in his message to Congress.

Because of the conflicts which have occurred between state highway officials and the Federal authorities, it is provided that in the case of any state failing to carry out the provisions of this agreement after construction or reconstruction of the highway, it shall be notified that after sixty days the commission will proceed to have the highway placed in a proper condition of maintenance and charge the cost against the Federal funds allotted to the state. This clause makes maintenance compulsory to the states, and is expected to do much towards overcoming neglect.

This program was reached after a conference here Monday with the Senate Postoffice Committee, in which Pyke Johnson represented the National Automobile Chamber of Commerce. A. G. Batchelder, executive secretary, and M. O. Eldridge of the American Automobile Association; P. M. Williams and H. G. Shirley of the Federal Highway Council; C. A. Vane, National Automobile Dealers Association, were spokesmen for the automotive and associated industries. Representatives of the farm organizations and American Association of Highway Officials were present.

ITALY EXEMPTS BRITISH CARS

OTTAWA, ONT., April 22—Italian customs authorities have been empowered to authorize the unrestricted importation without license of automobiles of British origin shipped from Great Britain, this applying to those of Canadian manufacture as well as those of the United Kingdom.

Bartlett Is Named Splitdorf Executive

Succeeds R. W. Sutherland As Managing Vice-President—Other Officials Change

NEWARK, N. J., April 27—M. W. Bartlett was elected vice-president and general manager of the Splitdorf Electrical Co. at a meeting of the directors here to-day. He will succeed R. W. Sutherland.

Bartlett is no stranger to the Splitdorf organization. He went with the company in 1911 as secretary and remained until 1919. During the war he handled all its export sales and built up a very substantial business. He resigned in 1919 to become Eastern manager of the Wire Wheel Corp. of America in charge of sales to manufacturers and dealers east of Buffalo, as well as export sales. He is popular in the Splitdorf organization and the directors are confident the company will show marked progress under his direction.

C. W. Brunnell was appointed sales manager of the Splitdorf company at the meeting to-day. He resigned from the Edison Lamp Works to accept the position. During his connection with the Edison company he developed all the sales of incandescent lamps for cars.

D. R. Walls was elected advertising manager to succeed P. A. Tanner.

Sutherland has not announced his plans for the future. He has been with the Splitdorf company since the Alvord interests obtained control in 1912, and has held various positions of responsibility.

Lower Price Rumor Malicious, Says Dodge

DETROIT, April 26—C. W. Matheson, general sales manager of Dodge Bros., denounced the report of a contemplated cut in Dodge prices as "a malicious rumor evidently started by competitors." "The price of the Dodge car will not come down until the manufacturing costs drop, and they are higher to-day than ever," said Matheson. "You can say there will be no cut now and none in the future insofar as we can see. We are building 450 cars daily and shipping only on orders, and we are selling them faster than we can build them."

Matheson also took occasion to deny a statement attributed to another member of the Dodge organization that the company would put out a new sedan May 1.

CHICAGO CUTS GAS TO 20

CHICAGO, April 28—A drop of 3 cents in the price of gasoline in Chicago and the Middle Western States was announced this week by the Standard Oil Co. of Indiana. This means a cut from 25 to 22 cents at the filling stations, and from 23 to 20 cents on tank wagons.

Hannum Appointed Oakland President

Saginaw Products Head Succeeds F. W. Warner, Voluntarily Retired—More Changes Likely

NEW YORK, April 26—George H. Hannum, general manager of the Saginaw Products division of the General Motors Corp., has been appointed general manager of the Oakland Motor Car Co. to succeed F. W. Warner. Hannum has played a leading part in the development of the parts group of General Motors and is regarded as one of the ablest executives in the organization.

While Warner has retired from the direction of the Oakland company, he remains a vice-president and director of the General Motors Corp. No announcement has been made either by Warner or the corporation regarding his future activities. It is evident from the fact that he remains an officer of General Motors that he will fill some place in the organization. It is understood that Warner's retirement from the Oakland plant was purely voluntary. Several other changes in the Oakland personnel are expected to follow his resignation from the company.

Reorganize Indiana Sales

INDIANAPOLIS, April 25—Reorganization of the retail plan under which the Oakland Motor Car Co. has operated in Indiana for some time is practically complete. State distribution of Oakland cars is to be taken over by the E. W. Steinhard Co., effective April 25, according to information obtainable to-day. Public announcement of the change is expected soon.

General Motors Accepts Collins Resignation

NEW YORK, April 28—General Motors Corp. announces that the resignation of Richard H. Collins as president and general manager of the Cadillac Motor Car Co., which was tendered on Jan. 14th, has been accepted.

Herbert H. Rice, formerly treasurer and now one of the vice-presidents of the General Motors Corp. has been appointed as successor to Collins and will take charge of the Cadillac in the near future.

The possibility of Collins' retirement has for some weeks been the subject of conjecture in financial and automotive circles.

N.I.V.A. Establishes Farm Power Bureau

(*Continued from page* 931)

be left with the Tractor show and demonstration committee. This is made up of J. B. Bartholomew, Avery; E. J. Gittins, J. I. Case Tractor Machinery Co.; G. B. Sharpe, Cleveland Tractor Co.; Harry Bates, Bates Machinery & Tractor Co.; J. A. Everson, International Harvester Co.; G. L. Gillette, Minneapolis Steel & Machinery Co.: Donald McDonald, Avery Co., and A. H. Gilbert, Rock Island Plow Co. There will probably be four demonstrations. The question of a show was touched upon and this matter will be left with the committee.

The consensus of opinion relative to state laws requiring tractor tests was that in any state where such laws were contemplated and recommendation should be made providing for the exemption from tests of tractors which had been tested in other states under similar laws. It was felt, at the same time, that, to avoid the multiplicity of state laws, which now seems to be on the decline, it would be better to enact a Federal law.

Willys Production to Be 450 Daily

(*Continued from page* 927)

taken home is that when one tries to run all the business in the world one only passes through about one such depression as we have experienced.

"I am selling out my interests in many of the other companies which I have taken to in the last few years and will give all my time to Willys-Overland."

Willys complimented Chrysler and said that although he was probably the highest salaried man in the automobile industry he was the cheapest man on the payroll because of the economy he had forced into the building of cars.

It was the most enthusiastic meeting of dealers here in many years. The bankers who were present at the meeting were particularly pleased with the showing.

Ford to Establish 50 Mexican Branches

HOUSTON, TEX., April 26—According to W. M. MacDonald, manager of the Houston branch factory of the Ford Motor Co., arrangements are being made for the establishment of fifty agencies of the Ford car in Mexico. MacDonald says the company is after the Mexican business and to establish connections in that country three men representing the Houston plant are in Mexico calling on the trade. These men will spend the next three months in the Mexican Republic and it is their intention to visit every part of the country they can reach to open markets for the Ford products.

RALEIGH BUILDS TWO MODELS

BRIDGETON, N. J., April 25—The Raleigh Motors Corp. is now building a four and a six-cylinder passenger car. The six is to sell for $2750 and the four for $2050. Details of the six cylinder model disclose the use of many standard parts such as Herschell-Spillman engine, Spacke axles, Westinghouse starting and lighting, Stromberg carbureter, Gemmer steering gear and Stewart vacuum system.

Renault Speeds Up on New Light Car

Goes Into Full Capacity on 10 H. P. Model Selling at 19,500 Francs

PARIS, April 14 (*By Mail*)—The Renault factory went into full production at the beginning of April on the modified 10 hp. popular car planned immediately after the armistice. There was considerable delay in getting this model on the market, and the price fixed in 1910 underwent many increases. Since the first series went through the shops several changes have been made in the design, and it is the new and definite type which is now in full production.

There have been no changes in the engine, which is a four-cylinder, 75 by 120 mm. The wheelbase is 111 in. and the tread 56 in., compared with the narrow tread used by some other French manufacturers of cheap cars. New and more powerful brakes are fitted. Both these are on the rear wheels, and are concentric internal expanding type.

Nickel plated fittings are now standard, as well as Michelin detachable steel disk wheels.

With the new type Renault carbureter it is declared that gas consumption is 32 miles to the American gallon.

Five body styles are standardized and produced in the former aviation department of the Renault factory. Storage batteries for starting and lighting are carried under the valence between running board and chassis frame. This space is also made use of for tool lockers. With four passenger body and complete equipment this car is listed at 19,500 francs, this price including the French luxury tax.

Renault officials declare that orders for 700 of this model have been received within two weeks, and that the factory is three months behind on deliveries.

France to Clear Out Two More Car Camps

PARIS, April 16 (*By Mail*)—Two more American automobile camps are being offered for sale as a whole. They are the camp at Bassens near Bordeaux, and remains of the Franchises camp, near Langres, in the Huate Marne. Individual sales have been carried on for some time at both these camps, but it has now been decided to clear out the material as a single lot. The Bassens camp contains 223 Holt tractors, 87 F.W.D. tractors and trucks, 208 5-ton Liberty trucks, 38 White trucks of various types, 52 Riker 4-ton trucks, about 30 Packards, and small numbers of Nash, Pierce-Arrow, G.M.C., Republic, Garford, and Mack trucks.

At the Franchises camp, near Langres, there are 85 Liberty trucks and about $2,000,000 worth of American automobile spare parts.

Sales of Equipment Show Gradual Gains

March Business Tops February 20 Per Cent—Dealers Maintain Normal Stocks

NEW YORK, April 23—Sales of automotive equipment in the New York district for March showed an increase of 20 per cent over February in retail selling and 22 per cent in wholesale, according to an investigation conducted by the research department of the Class Journal Co. Tire sales at retail showed an increase of 18 per cent and at wholesale 24 per cent.

The investigation showed a general tendency to maintain normal stocks of supplies, and in some cases, particularly among those handling equipment as a side line, there was a tendency to enlarge. In tires a movement toward more extensive use of cheaper grades was found, the feeling among the buying public being that higher-priced lines should be reduced.

Uniformity of complaint was found in the tire trade against the selling of reimported A. E. F. surplus tires as new stock. It is thought these tires will prove defective, owing to deterioration of quality through aging, and that the ensuing dissatisfaction will have an injurious effect on all tires bearing these brands.

Reports received by the research department indicate that sales of equipment began to pick up about March 1 in New York, Chicago and Minneapolis, and about March 15 in Boston. Sales are found to be still slow in Cleveland, Pittsburgh and through the South.

On the whole, business was found to be behind last year's figures in the equipment line in New York, the decrease ranging from 12 to 20 per cent. Practically all of the supply business was shown to be in the hands of regular equipment dealers, the sales in hardware, department and sporting-goods stores being negligible, except where distinct departments were opened.

NASH TO BUILD ADDITION

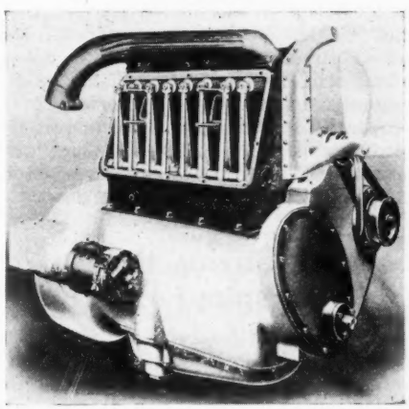
KENOSHA, WIS.. April 22—At the quarterly meeting of the directors of the Nash Motors Co. held here to-day it was announced that the company planned to build an addition to its plant in Milwaukee. The addition will be 100 x 600 ft. and three stories high, and will be large enough to provide for a large increase in the output.

WILCOX IN RECEIVERSHIP

MINNEAPOLIS, April 25—The H. E. Wilcox Motor Co. has gone into the hands of a receiver. Judge W. F. Booth of the Federal Court named Frank E. Satterlee, president and manager of the F. E. Satterlee Co., wood and iron working machinery and mill supplies. The petition was filed by the Standard Foundry Co. with claims of $9,545.08. Accounts outstanding against the company were said to total $50,000. Frederick E. Murphy, J. C. Compton and M. C. Barnum were named appraisers to estimate assets of the company. Creditors were given 45 days to make returns. Back wages of $5851.17 were ordered paid employees. The receivership was instructed to operate the repair department of the Wilcox factory to give service for 2000 Wilcox truck owners in the Twin Cities. The receiver's bond was put at $50,000. The company agreed to the receivership and admitted the claim of the complainant company.

Roamer Makes Record With Rochester Engine

DAYTONA, FLA., April 25—A regular stock Roamer chassis powered with the new four-cylinder, horizontal valve Rochester-Duesenberg engine and driven by L. F. Goodspeed, chief engineer for the Barley Motor Car Co., created what is claimed to be a world's record for a stock chassis by making the measured mile in 34.26 seconds, or at the rate of 105.08 m.p.h.



The Rochester Duesenberg

Designed by Fred S. Duesenberg, the engine was originally 4 x 6 in. and as such was raced all over America. Last year the Rochester Motors Corp. took over the production as a commercial proposition. The first engines turned out were powerful but not flexible enough for every-day use. The motor was redesigned and the size increased to a bore of 4¼ in. and a stroke of 6 in., and the power increased over 50 per cent above that of the earlier motors built. Flexibility was greatly improved, the motor was made quieter and generally refined down. The first motors to come through production were tested by engineers of the Barley Motor Car Co. in January of this year, and they decided to try some in their standard, stock Roamer sport models. The success of these led to the speed trials just held.

ROBERT J. DUBARRE DIES

MILWAUKEE, April 25—The death is announced of Robert J. DuBarre, assistant manager of sales of Geuder, Paeschke & Frey Co., manufacturers of galvanized sheet and steel ware.

Fordson Production on 200 Daily Basis

Wide Distribution Brings Gradual Increase in Production—Car Orders Exceed Schedule

DETROIT, April 22—Two hundred Fordson tractors are now leaving the assembly line at the River Rouge plant every day. The plant reached a daily production of 200 on March 24 and a few days later hit 225. Since the first of April, however, the output has averaged 200 daily, which schedule will be continued. Up to April 7, 2557 Fordsons had been built. There has been a proportionate increase in the number of men employed since production at the tractor plant was resumed in February.

Distribution has been scattered throughout the East and Middle West, with 305 Fordsons having been sent to Canada in the last two weeks. These were shipped to the Ford Motor Co. of Canada, and from there to the Ford branch at Toronto for distribution. Large numbers of Fordsons were sent to Connecticut, Pennsylvania, Wisconsin, New York, Indiana, Ohio and Illinois.

The big plant at Highland Park is increasing production of passenger cars and trucks daily, and while the schedule of 90,000 was fixed as the maximum for April, up to April 10, 107,719 cars and trucks had been requisitioned for the month. During the first three months of 1921 the demand for Ford cars and trucks greatly exceeded production, officials declare, and on April 1, with a total production during the three months previous amounting to 127,074 cars and trucks, the company had 102,000 unfilled orders on its books.

LOOK FOR MAY TRUCK BOOM

SPRINGFIELD, OHIO, April 21—"We are operating with the force we have maintained for the last few months filling orders as they come in," said A. K. Stewart, general manager of the Kelly-Springfield Motor Truck Co. "We are holding our own and prospects are better than they were. It is expected that there will be an increased demand for motor trucks in May." The force is gradually being reorganized, preparatory to meeting the improvement in business expected. James L. Geddes, chairman of the board of directors, who has been ill at his home for several weeks, is now able to be out for a few hours each day.

TO BUILD NEW STEAM CAR

CHICAGO, April 25—The Crossland Steam Motive Corp. of this city has been licensed by the Crossland Pfaff Engineering Laboratories to manufacture a steam car to be called the Crossland. The car is to have a wheelbase of 131 in., will sell for $3600, and will have a two-cylinder steam engine operating under a pressure of 600 lb.

Stockholder Action on Goodyear Delayed

Ratification of Refinancing Held Over to Monday—Quick Recovery Expected

AKRON, April 27—Postponements of the special meeting of Goodyear Tire & Rubber Co. stockholders, called to approve the refinancing program, follow in rapid succession. The latest ones were from Monday until to-day and from to-day until next Monday.

President F. A. Seiberling and Vice-President C. W. Seiberling have returned from New York where they spent several days in consultation with the bankers. F. A. Seiberling has declined to comment in any way on the passing of the company's control from his hands into those of the bankers. Representatives of the financial syndicate which has put over the $85,000,000 refinancing program will direct the affairs of the great tire plant for the 20 years which the new securities will run. The subscription books for the 8 per cent first mortgage bonds already have been closed and the issue oversubscribed.

It is understood here that no decision has been reached concerning who will succeed Seiberling as president of the company, or who will fill other positions in which it is expected changes will be made. It is not improbable that a financial man will take the helm until conditions are on a more satisfactory basis.

While it has been announced in New York that the Seiberlings will be ousted, it is hoped here that no such drastic step will be taken and that the new control will be more supervisory than active. The banking interests are expected to designate at least one vice-president for the company as well as the treasurer to prevent a repetition of what they regard as reckless expenditure which was considered largely responsible for the present plight of the company.

Akron bankers and rubber manufacturing experts, after a careful study of the refinancing program, have expressed the opinion that the company will be able easily to work out of its present financial position during the 20 years allowed by the life of the bonds. The increased capital charges added by the bonds, and prior preference stock if the total amount of bonds required remains at $85,000,000 together with sinking fund charges, will approximate $14,000,000.

Goodyear records show that the company's net earnings since 1913, up until last year, amounted to a total of $70,067,490, out of sales aggregating $576,109,108. The net earnings for the three years previous to 1920 were larger than during other years. In 1917 net earnings for the first time exceeded $10,000,000 and were about $14,000,000. In 1918 the earnings increased to $15,000,000 and rose to $23,000,000 in 1919.

Goodyear did a total business of over $200,000,000 last year, but due to contractual obligations and writing down of inventories, reported a deficit instead of a profit. The company is now working on a basis of 20,000 tires daily, as compared to normal production of 23,000 tires a day, and at this rate will do a business this year of more than $140,000,000.

(*Continued on page* 940)

Three Automobile Men on Hoover Committee

WASHINGTON, April 25 — Three representatives of the automotive industry have been invited to assist Secretary of Commerce Hoover in the reorganization of the Department of Commerce along lines that will make it useful to industry in the development of foreign and domestic trade. Thirty-six leaders will meet here Friday for conferences and business paper editors will gather on Monday for the second of monthly meetings with Secretary Hoover.

J. Walter Drake, chairman of the Foreign Trade Committee of the National Automobile Chamber of Commerce; John J. Raskob, chairman, finance committee, General Motors Corp., and W. H. Stackhouse, president, National Implement and Vehicle Association, will discuss the problems of the automotive and allied industries. It is proposed to change the personnel of the conferees in order to keep in touch with special men in all industries as the problems in their particular field arise.

Gasoline Buying Drops Despite Lower Prices

WASHINGTON, April 21—Price cuts failed to make any material difference in volume of gasoline consumption as the Bureau of Mines refinery statistics for February show that the daily average of gasoline production fell off by one million gallons but the stocks increased by 108,000,000 gal. The lessened demand was also reflected in increase of 18,000,000 gal. of lubricating oils in reserve with a decreased production of 185,000 gal.

The figures show that there were 680,540,351 gal. on hand at the end of February. Exports amounted to 52,497,051 gal., shipments to insular possessions 4,536,619, and domestic consumption 225,195,372 gal. The daily average consumption was 10,079,609 gal.

FEDERAL SPARK PLUG MOVES

WESTFIELD, MASS., April 26—The spark plug manufacturing plant of the Federal Corp. has been sold at auction to George N. Gray, representing the Shawmut National Bank of Boston on foreclosure of a mortgage. A statement was issued by the company that the business would be continued in a new location here and that a large manufacturing firm located in the eastern end of the State would come here and locate in the present plant of the Federal corporation.

Milwaukee Industry Has Turned Corner

Bank Review Shows Business Decidedly Better—Heavy Cuts in Inventories

MILWAUKEE, April 25—"The automotive trades seem to have turned a corner in the last month or two," says *Business and Financial Comment*, the monthly review of local financial and commercial conditions issued by the First Wisconsin National Bank of Milwaukee. "The month's sales for all Milwaukee industries were decidedly better than for the previous month. The gain was especially apparent in the automotive parts and equipment industries. Forward business shows a tendency to increase. Future purchasing commitments are still conservative. Few manufacturers are buying more than they need in the immediate future. The lessening of heavy inventories still goes on.

"In the automotive trades, sales last month were about 75 per cent better than the previous month, but probably a third under the same period of 1920. Inventories are still above normal and greater than a year ago, and consist mostly of raw material. As soon as it is possible to use up steel already bought and to take advantage of lower steel prices, the industry should better its situation materially.

"Manufacturers of rubber tires and products report a gradual improvement in orders. The mild winter and the approach of the season when motor cars are in greater use have promoted the unloading of tire stocks and the resumption of operations on a limited scale for replacement.

"As a rule, lines which use iron and steel products have been waiting for prices to reach a point of stabilization. The Steel Corporation's latest reductions should go far to reassure buyers and stimulate business in machinery, farm implements, motor cars and trucks, public utilities and construction lines.

"It has been the experience of periods similar to this in the past that lower prices on iron and steel products promote industrial revival."

FORD BRANCH ON THREE SHIFTS

DES MOINES, April 21—The Des Moines Ford branch is working at full capacity and has three forces of 400 men each employed at full time. The plant is turning out daily 165 coupe and sedan bodies, 160 cars, and 100 tractors. Cars and tractors are being distributed in Iowa while the bodies are shipped into Southern and Western territory, according to W. K. Edmunds, branch manager. That the low priced car is the only one which is meeting with a ready sale in Iowa under present financial conditions, is shown by the fact that in the March registrations of Polk County, in which Des Moines is situated, nearly 80 per cent were Fords.

Crop Prices Slow Carolina Business

Manufacturing Sections Show Brightest Sales Prospects—Rural Buying at Standstill

CHARLOTTE, N. C., April 25—The avalanche of motor car sales precipitated under the stimulation of war prices when cotton sold at 40 to 46 cents a pound, and tobacco 95 to 125 cents, stopped abruptly last September. From September until February very few cars even of the cheapest makes were sold, but in the five weeks beginning March 1, there has been an unexpectedly heavy improvement in sales, particularly in cities of 10,000 population or over, of which there are eleven in North Carolina.

The western half of North Carolina is one of the best areas for motor car sales in the Southeast, if not in the entire South. On the other hand, the eastern half of North Carolina is perhaps the poorest sales area to be found, even the cities showing very little business. The State of South Carolina is completely dormant, no sales taking place in the country areas and few in the larger cities with the possible exception of Columbia, where the presence of Camp Jackson, into which flows $1,000,000 per month from the Federal treasury, has created business.

Retail sales in Charlotte are not so good at present as in some of the other towns in the western part of the State, due largely to the slowing down of cotton mills in the city and unemployment. This situation is more seriously reflected in Charlotte as many of the factories have headquarters here, and the city is more responsive to the industrial pulse than are the smaller cities in the western part of the State.

As is the case throughout the entire South local Ford dealers are practically out of cars and for some time have been picking up carloads from dealers in the territory and driving them 100 to 150 miles to the city. Through the territory many of the Ford dealers have stocks on hand.

Supply of Cars Not Heavy

With several local distributors there is not a heavy supply of cars on hand for the two Carolinas, whereas with some makes there are 90 days' supply in the territory. The Nash distributor has not over a 15-day supply. Oakland through the territory has a 30-day supply, as has Studebaker. Buick with its large dealer organization throughout the two states has not a 30-day supply. As with many others its sales in March were greater than those in December, January, and February together. Willys-Overland has a small stock in the territory. The low supply of several distributors is due largely to them not having taken cars from the factories since August. There are hundreds of dealers in the territory who have not taken a car from a distributor since August 1. These dealers are still in business carrying on a repair and garage business and endeavoring to sell the cars they have been stocked with since August.

The situation in eastern North Carolina and all of South Carolina, where business is at a standstill, can be grouped for trade considerations. It is difficult to realize how completely and continuously business has been suspended in this area. There are still no sales in such towns as Wilmington, Newbern and Elizabeth City where the average is not 10 per cent normal. There is no available money with which to buy cars, although there are hundreds of buyers if means to finance the purchase were at hand. The banks will not handle car or truck paper.

Tobacco Heaviest Hit

Before the slump in these places last September the dealer bought all of the cars he could secure. The tobacco prices were largely responsible for this. When the market broke in September car sales stopped as quickly. In Greenville, where a dealer of a medium-priced car sold 200 in 1920, that dealer has not sold a car since August. There are reports that the Ford dealer in Littleton has sold only two cars since January. There was only one car sold in Anderson County from December until April 1.

In the South Carolina area where long staple cotton is grown, which sold last year at $1.25 per pound and is now at 20 cents, business is at a standstill. Such towns as Chesterfield, Darlington, Marlborough and Florence in this area have suffered badly.

The conservative motor car dealers in Charlotte are not anticipating much business this year. There will be a pick-up in September and October when the crop is harvested but nothing approaching that might be designated as normal business in contrast to abnormal business of two years ago. It will be the crop of 1922 that should bring the normal fall purchasing. The crop of 1920 must be sold and the revenue from it will go to the bankers and merchants. It will not pay all their debts. It will not be until the crop of 1922 that the farmer will have surplus money for purchasing. Business will be improved by the money from the 1920 crop getting into circulation when it is sold.

No Truck Market Since August

There has been no truck business in this territory since August. What is true of all the Gulf states applies equally to the Carolinas, namely, that too many dealers took on truck lines in 1919 and to-day have $8,000 or $9,000 tied up in trucks which can only be moved with difficulty in perhaps a year. In not a few cases this money tied up in trucks is responsible for the hard pressed condition of the dealer to-day. Ford dealers are generally stocked with tractors which are not moving except in a few cases. Some dealers have 10 to 15 in stock, which is hampering their activities financially.

METAL MARKETS

CONDITIONS in the steel market have undergone very little change as the result of the Corporation's price revision. The "independents" are working on orders placed at the prices named by them before they raised their quotations to bring them up to those of the Corporation. The latter has benefited by its price announcement only to the extent of releases on tonnages that had been suspended pending just such a revision. Neither the Corporation nor the "independents" have booked any representative fresh business. From the very outset, the new price levels were looked upon as a sort of stop-gap. Taking stock of prevailing conditions, the powers that be in the steel industry recognized the fact that they would achieve very little by genuine price reductions at this time. Neither the railroads nor the building industries are in shape to place orders at this moment at any price. The chief demand is from the automotive industries. Many of the steel manufacturers, especially the sheet makers in the Youngstown district, are apprehensive lest the demand from the automotive industries become more halting in July. Meanwhile, they believe apparently that what automotive business is to be had can be booked at the prevailing prices and that there would be nothing gained by cutting these. A significant point in this connection is that the new price for sheet bars is $39, while that for billets is $37. Most steel men prefer orders for sheet bars to orders for billets and it is more than doubtful whether it costs more to roll sheet bars than billets. Sheet bar tonnages are usually far more satisfactory than those of billets. So that the only explanation why sheet bars should sell at this time at $2 above the price of billets is that the bulk of sheet bar production is intended for automobile sheets, and the traffic in these can stand the $2 premium over billets. From the steel producer's point of view this attitude is perfectly logical. In fact, it is based on a very fair appraisal of the class of orders that emanates from the automotive industry these days. Not a pound of steel is being bought that is not needed to maintain the actual schedules, and producers of steel are apparently of the opinion that price cuts would have to be much deeper to be fraught with immediate results in the shape of much larger orders. Before they can make such cuts, wages and freight rates must be pared.

Pig Iron—Foundry No. 2 and malleable are selling at $24 and upward, with the nominal quotation $25, valley. One Cleveland interest has made sales at as low as $26, local delivery. Lower wages are to be put into effect in some of the Midd'e West automotive foundries next Monday and spasmodic interruptions to production as the result of strikes are feared.

Steel—Both unshipped balances on account of old orders and new business in cold-rolled and cold-drawn steel bars are being billed at 3.10c. base, which makes the differential over hot-rolled, the latter based at 2.10c., $20 a ton. Several thousand tons of orders from automotive sources are hanging over the market. The sheet market is relatively steady.

Aluminum—The market continues quiet and more interest waits on a clearer picture of what tariff prospects are.

Lead—American Smelting & Refining Co. has reduced lead quotations $2 a ton to $4.35 New York and East St. Louis.

FINANCIAL NOTES

Stewart-Warner Speedometer Corp. declared a quarterly dividend of 50 cents a share payable May 15 to stockholders of record April 30. Previous quarterly dividends were at the rate of $1. The business of the corporation is reported to be running close to normal and better than anticipated. A quarterly statement of earnings is expected in a week or ten days.

Dunlop Tire & Rubber Co. will pass under voting control of the Dunlop Rubber Co., Ltd., by the exchange of 2,000,000 shares of the latter for 3,000,000 shares of the American voting trust. It was also reported that $8,000,000 would be required for initial working capital for the American company.

Kelly Reamer Co., Cleveland, has increased its capital stock from $60,000 to $250,000 and all shares offered were taken by present stockholders. The company has just held its annual meeting in the new factory building, the board of directors being returned to office.

Prather Wheel Mfg. Co. of Detroit has been incorporated with a capital of $1,000,000 by Frank M. Prather and Frank Eack. Prather is the inventor of a resilient wheel truck which it is proposed to build.

India Tire & Ruber Co., Akron, paid on April 1 a quarterly dividend of 1¾ per cent on its prefered stock and 2 per cent on its common stock.

H. H. Franklin Mfg. Co. has declared the regular quarterly dividend of 1¾ per cent on its preferred stock payable May 1.

INDUSTRIAL NOTES

Cincinnati Grinder Co., Cincinnati, has placed the sale of its line of grinding machine on an exclusive basis with the Marshall & Huschart Machinery Co. in the Chicago district; Motch & Merryweather Machinery Co. in the Cleveland, Cincinnati, Pittsburgh and Detroit district; Henry Prentiss & Co. in the New York and New England district, and will also maintain its own grinding specialists in the respective territories.

William F. Hudson, president of the Flexo Co. of America, is placing orders for materials to make up 30,000 Flexos (extensions for Ford trucks), and is also buying material for the Hudson Motor Truck Co. of America, which will turn out a line of trucks of 2½ tons up.

Black & Decker Mfg. Co. has moved its Atlanta branch office to 1508 Candler Building, where Thomas W. Peters, southern branch manager, will make his headquarters. The Detroit office has been moved to 27 Watson Street.

United States Rubber Co. directors have again chosen Samuel P. Colt, chairman; Lester Leland, vice-chairman; Charles B. Seger, president. The executive committee consists of James B. Ford, Walter S. Ballou, Nicholas F. Brady and James S. Alexander.

Hall Syndicate, Inc., Philadelphia, organized to manufacture and sell the Hall flexible wheel, Hall felt liner and other products, has opened sales and show rooms at 1838 Market Street here and in Camden.

Milwaukee Auto Engine & Supply Co., Milwaukee, manufacturers of the Milwaukee timer for Fords, reports operation at 100 per cent capacity. April is the biggest sales month in the company's history.

Kelly-Springfield Tire Co. has opened its plant at Cumberland, Md., and started manufacturing. The plant cost $11,000,000 and took three years to build.

Southern Motor Mfg. Assn., Ltd., Houston, has just completed another factory unit, which will be used as a paint and trim shop for Ranger cars.

Continental Car Co. of America, Louisville, Ky., has increased its capitalization to $1,000,000, to provide for extensive improvements to the plant.

American Tire Corp. promoters are under investigation by the Federal grand jury to determine the legality of the sale of the company's stock.

Ewing Bolt & Screw Co., one of the late additions to Detroit industries, has started operations in its plant at River Rogue.

Rome Wire Co., Rome, N. Y., has completed a weatherproof wire mill and has started operations.

Woodworth Mfg. Corp. has moved its factory from Niagara Falls and located at Binghamton, N. Y.

Reed, Tilley & Co., Inc., has removed to the Robertson-Cole Building, New York.

Masters Motor Co. will move its main plant from Saginaw, Mich., to Erie, Pa.

Interlocking Tires Sues for Balances on Stock

AKRON, April 22—Thirty-six separate actions against as many stockholders of the defunct Interlocking Cord Tire Co., of Akron and Mogadore, have been filed in the common pleas courts of Summit County by Elihu Harpham, receiver of the company, for recovery of the balances due on their unpaid stock subscriptions. The actions constitute the forerunner of 480 similar actions to be started, according to Harpham, for an aggregate of $290,000, claimed to be due on subscriptions for stock negotiated before the appointment of the receivership.

The thirty-six actions already started are for amounts ranging from $100 to $4900, and for a total of $21,417.

Immediate payment by shareholders of the unpaid balances due on their stock subscriptions is necessary in order to liquidate the company's affairs and to satisfy creditors whose claims exceed $200,000 according to Harpham.

RECEIVER CONTESTS CONTRACTS

TOLEDO, OHIO, April 25—H. R. Greenlee, receiver for the Erie Tire & Rubber Co. of Sandusky, has filed recommendations in Federal Court for the disposition of contracts on which part of the materials contracted for have been delivered. In all cases the materials were contracted for when war prices prevailed and before the receivership began. Some consignments were received and paid for at the inflated prices. The balance of them are being held pending instructions of the court.

ROCK ISLAND CUTS PRICES

ROCK ISLAND, ILL., April 22—The Rock Island Plow Co. has cut prices on all its products 10 per cent. The cut is effective immediately. Tractor and tractor tools cut 15 per cent a month ago are not affected by the new order.

BANK CREDITS

Written exclusively for AUTOMOBILE INDUSTRIES *by the Guaranty Trust Co, second largest bank in America.*

NEW YORK, April 28—After the firmness of the previous week, the money market again eased last week. Call money, after renewing at 7 per cent on the first two days of the week, declined to 6½ per cent and finally to 6 per cent on Friday. The range for the week was 6 per cent to 7 per cent, the same as the previous week. "Outside" money was said to be available at 5½ per cent. There was little change in the time money market, where the demand was light, and quoted rates were unchanged from the previous week, with 6½ per cent bid and 7 per cent asked.

The week-end statement of the Federal Reserve System showed a continuation of the improvement which has been taking place since the first of the year. The ratio of total reserves to deposit and Federal Reserve note liabilities combined increased from 53.7 per cent to 54.1 per cent, the highest ratio since the first week of September, 1918. This was largely a result of the further increase in gold reserves of $11,192,000. Federal Reserve notes in circulation also declined $11,827,000, and at $2,856,700,000 are $548,231,000 below the high of Dec. 23, 1920. Bills discounted secured by U. S. Government obligations increased $13,479,000, while total bills on hand declined $5,828,000. Total earning assets declined $13,048,000, and total deposits $5,592,000. The ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against deposit liabilities, increased from 65.2 per cent to 65.8 per cent.

Changes in the condition of the New York Federal Reserve Bank harmonized with those of the entire System. Gold reserves increased $8,721,000, while total bills on hand, total earning assets, total deposits and Federal Reserve notes in circulation declined. As a result, the ratio of gold reserves to Federal Reserve notes in circulation, after setting aside 35 per cent against deposit liabilities, increased from 69.5 per cent to 70.6 per cent. The week-end statement of the New York Associated Banks was also favorable, although excess reserves over legal requirements declined $6,847,860. Loans declined $68,630,000, and net demand deposits $42,558,000.

The foreign exchange market was featured last week by an unusually narrow range of quotations. The range for Sterling, for instance, was $3.92 to $3.94½, the latter being the highest quotation since July 17, 1920. On Monday of this week Sterling touched $3.95. The narrowness of the range of quotations, if continued, may be taken as an indication of a crystallization of opinion as to the actual state of affairs in Europe. About mid-week there was weakness in practically all the continental exchanges, with a slight recovery on Saturday. Marks declined from 1.60½ to 1.50½ on Saturday.

MEN OF THE INDUSTRY

Otis R. Cook was elected vice-president and director of the Howe Rubber Co., New Brunswick, N. J., at the annual meeting. Cook has purchased a substantial interest in the company and will take over all sales May 1 and handle them through his own selling organization. Headquarters will be in the Cook Building, Cleveland. H. H. Grobe will be general sales manager of the new company, coming with Cook from Kelly-Springfield, where the latter had been vice-president, director and general sales manager for ten years to Jan. 1, 1920. He resigned at that time to build the Cook Building in Cleveland, which is now completed. Cook succeeds E. A. Sattler with the Howe company.

W. M. Letts, managing director of Willys-Overland-Crossley, Ltd., of Manchester, England, sailed for home on the Olympic Wednesday after a brief visit to New York for conferences with the Willys executives. He is much gratified at the business done by his company in the face of discouraging conditions in England, and believes the outlook for the coming year is even more encouraging. Industrial affairs in England have run virtually the same course as in the United States, but there had been signs of improvement up to the time the miners' strike began and Letts is hopeful of a steady upward trend as soon as the labor difficulties are definitely settled.

H. D. Babney, who recently resigned as secretary of the National Association of Motor Truck Sales Managers, has been appointed assistant secretary of the Automotive Electric Service Association, with headquarters in New York, which was organized at Rochester last July by representatives of authorized service stations. The chief purposes of the organization are to encourage co-operation between its members and the manufacturers whom they represent and to encourage the use of only genuine parts for repair or replacement service. D. W. Burke, of Detroit is the president.

W. S. Doty, formerly of the Cleveland Tractor Co., has joined the Globe Motors Co. organization, Cleveland. He has acquired a substantial financial interest, will act as treasurer and have charge of operations. His connection with Cleveland tractor was as auditor, assistant secretary and assistant treasurer, in the order named. Doty's automotive experience also includes two years with the Torbensen Axle Co., two years charge of the general offices of the Denneen Motor Truck Co. of Cleveland, and several years as a retailer and distributor.

Edward J. Post has been appointed manager of the Chicago branch of the Oshkosh Truck Sales Co. of America, which has taken over the international selling rights of the Oshkosh Motor Truck Mfg. Co. of Oshkosh, Wis., and N. O. and S. S. Gilbert for many years identified with the motor truck business in Chicago, have been appointed mid-west distributors. Offices have been opened at 1509 South Michigan Avenue, Chicago.

Arnold Joerns Co. of Chicago has been appointed advertising representative for the King Motor Car Co. by A. Weber, president and general manager. The Joerns company has opened a Detroit office in the Kresge Building in charge of Robert Davis. Weber has announced also that a well-known Chicago man, who has been in charge of King distribution there, will join the factory staff as assistant to H. Alperin, sales manager.

D. Henry Bonner, recently in charge of the branch house organization of the Ford Motor Co., has been made sales manager of the Four Wheel Drive Truck Co., Clintonville, Wis., manufacturers of the F. W. D. truck. Bonner was associated with Ford for over seven years in various capacities. He was superintendent at Cambridge, Mass.; assistant manager at Rochester and assistant manager at Pittsburgh.

Hilton W. Sofield, former vice-president and general manager of the Keystone Truck Co. of Philadelphia, as well as builder and designer of the Keystone truck, has reentered the automobile field after a nine month retirement. Sofield has incorporated a new company, known as the Penn Motors Corp., to manufacture popular size trucks.

E. D. Shearman of Jamestown, N. Y., has been elected a director and secretary of the Collier Motor Truck Co. of Bellevue, Ohio. Shearman was one of the original organizers of the Salisbury Wheel & Axle Co. of Jamestown, and was its general manager until it was sold to eastern interests in 1919.

H. A. Wagner, formerly general manager of the Reliance Motor Truck Co., Appleton, Wis., has resigned from that concern but has not yet announced his future plans, although it is expected that he will continue in the motor truck industry, with which he has been so long identified.

T. G. Graham, formerly with the Goodyear Tire & Rubber Co. of this city, and more recently factory manager for the Inland Rubber Co. of Chicago, has been named factory manager for the Mason Tire & Rubber Co. of Kent.

George H. Stebbins has been appointed factory superintendent of the Continental Car Co. of America, Louisville, Ky. Stebbins was formerly with Ford. Irving Miller has been appointed secretary of the company.

E. J. Welch, assistant advertising manager of the Goodyear Tire & Rubber Co., has resigned to become identified with the advertising and publicity department of the Hudson Motor Car Co., of Detroit.

E. E. Stanford, purchasing agent of the Westcott Motor Car Co., Springfield, Ohio, has been elected vice-president of the Victor Products Co., also of Springfield.

R. L. De Voe has been appointed general sales manager of the Dawson Mfg. Co., Chicago, manufacturers of grease cups and equipment.

Lockwood Manufacturing Passes Back to Parent

KANSAS CITY, April 26—The Lockwood Mfg. Co., operating under receivership since April 9, this year, was sold, April 23, as a going concern, for $122,100. The purchasers are W. C. Sommerville, president, and Walter L. Wilson, vice-president and treasurer of the Baker-Lockwood Mfg. Co., Inc., Kansas City—the Baker-Lockwood company being the "parent concern" from which the Lockwood interests withdrew in January, 1920. The obligations of the Lockwood company are said to have been about $400,000, and assets, including raw materials, goods in process, completed merchandise, machinery, and equipment, about $300,000

Albert Newman, vice-president of the Commerce Trust Co., Kansas City, was appointed receiver April 9 and continued operations, buying materials for manufacturing, producing goods, and shipping. There has therefore been no cessation in the activity of the Lockwood company, and it will now continue. The purchasers have not announced their exact plans with reference to it.

Minnesota Bases Fee on Factory Sales Price

ST. PAUL, April 25—The Minnesota legislature adjourned April 20 after finishing up the legislation required to make the Amendment No. 1 road law for building and maintenance of trunk highways in Minnesota workable. The automobile license fee was settled after long debate and consideration of many amendments at 2 per cent of the sale price of the car f.o.b. the factory, with down gradations proportional to the age of the car to be registered. This tax is expected to give some $6,000,000 a year.

Although it was the general understanding that this tax was to be in lieu of all other automobile taxes when the people voted for the amendment last November an opening was made by the legislature for a wheelage tax, which, is already in operation in St. Paul and Duluth. At the final elimination it was found that the new law permits a tax of not more than one-fifth of the State tax, or 20 per cent. The law also now provides that the State ultimately will refund bonds already issued by the counties with approval of the State highway commissioner for building trunk roads, and will pay the interest thereon.

HAYNES STEVENSON DIRECTOR

INDIANAPOLIS, April 21—Elwood Haynes was elected a new member of the board of directors of the Stevenson Gear Mfg. Co. at the annual meeting of the stockholders here. Other members of the board who were re-elected follow: G. E. Stevenson, G. R. Stevenson, E. C. Jones, of Indianapolis; T. J. Stephenson of Anderson; Simeon McQuiston of Kokomo, and R. T. Wingo of Detroit. The directors decided at the meeting to build a subsidiary plant at Detroit. The company has perfected a machine for multiple gear cutting.

TO FORM OLD TIMER SECTIONS

NEW YORK, April 25—Directors of the Old Timers' Club at a meeting here decided to encourage the formation of sections in various parts of the country. The membership is rapidly increasing and the directors decided to promote annual reunions at the national shows and through local sections at other shows. The membership will be brought together for discussion of automobile projects which it will be fitting for the organization to support.

Calendar

SHOWS

Sept. 28 - Oct. 8 — New York, Electrical Exposition, 71st Regt. Armory, Electric Equipment, Machinery and Vehicles.

FOREIGN SHOWS

May 28, 1921 — Czecho-Slovak International Automobile Exposition of Cars, Trucks, Tractors, Motorcycles and Equipment. Prague.

May 28-June 8 — International Automobile Exhibition, Basle, Switzerland.

June, 1921—Reykjavik, Iceland, Agricultural Exhibition—Agricultural Machinery—Ice'ander Agricultural Society, Reykjavik, Iceland.

September—Buenos Aires, Argentina, Passenger Cars and Equipment. La Pabellon de las Rosas. Automovil Club Argentino.

September—Buenos Aires, Argentina, Cars, Trucks, Tractors, Farm Lighting Plants and Power Farming Machinery. Palermo Park; Sociedad Rural Argentina.

September—Luxemburg, Luxemburg, Agricultural Sample Exhibition.

Oct. 5-16—Paris, France, Paris Motor Show, Grand Palais, Administration de l'Exposition Internationale de l'Automobile, 51, Rue Pergolèse, Paris.

Nov. 4-12 — London, British Motor Show, Society Motor Mfrs. and Traders.

CONVENTIONS

May 4-7 — Cleveland, National Foreign Trade Council.

May 6—Detroit, N.A.C.C. Advertising Managers Meeting, Detroit Athletic Club.

May 17-19—Buffalo, Convention of Factory Service Managers, Auspices of Service Committee, N.A.C.C.

May 23-26 — Chicago, A.S.M.E. Spring Meeting, Congress Hotel.

May 24-28—West Baden, Ind., Summer Meeting Society of Automotive Engineers, West Baden Springs Hotel.

July 4-9 — Mackinac Island, Mich., Summer Meeting Automobile Equipment Association.

Oct. 12-14, 1921 — Chicago, Twenty-eighth Annual Convention National Implement & Vehicle A'ssn.

RACES

May 31 — Indianapolis, International Sweepstakes.

June 18—Uniontown, Pa., Speedway Events.

July 25—Grand Prix, Le Mans.

Labor Day—Uniontown, Pa., Autumn Classic.

S. A. E. MEETINGS

Dayton Section—May 3.

Indiana Section—May 5.

Washington Section — May 6, Shaped Piston Rings, Cosmos Club.

Midwest Section — May 13, Smoker, Dinner and Entertainment at Chicago Automobile Club.

Dayton Section—May 17, H. L. Horning.

Cleveland Section—May 20.

S.A.E. Sports Program Covers Many Events

NEW YORK, April 23—The sports program which has been arranged for the semi-annual meeting of the Society of Automotive Engineers at West Baden on May 24 to 28 will be one of the most ambitious ever planned by the organization. It will include everything from tug-of-war to croquet, with appropriate prizes. Golf, tennis and trapshooting tournaments are planned, as well as two baseball series. The women who attend the convention will be entertained by card parties, clock-golf, croquet and tennis. In addition to these there will be a dancing contest.

The reduced-fare plan which has been arranged with the railroads differs from the one in effect at the annual meeting last January. A reduced-fare certificate will be mailed by the society to its members about May 1. This must be presented when transportation to West Baden is purchased in order to secure a 25 per cent reduction. Round-trip tickets only may be purchased under this plan, no stop-overs are allowed, and the same route must be used in both the trip to West Baden and return. A map which will be mailed with the certificates will show the area in which this reduced-fare plan applies.

Light Cars Popular with Spanish Buyers

WASHINGTON, April 21—Reporting on automobile trade conditions in the Cadiz, Spain, consular district, American Consul B. Harvey Carroll has advised the Bureau of Foreign and Domestic Commerce that there are approximately 700 automobiles and trucks in active use in the district. The United States, England and France export to that market and a few cars of Spanish manufacture are also sold. Those of American manufacture are the most popular and outnumber all others used in the district.

Prices for automobiles vary from 7300 ($1460) pesetas for a light type runabout car to 30,000 ($6000) pesetas for the heavier touring cars. Cars of light type are the most popular owing to the poor condition of the roads off the main lines of travel and narrowness of the city streets.

Gasoline is expensive—1.30 pesetas per litre at the time the report was made, March 30, for a product of inferior quality. Lubricating oil for automobiles retails for 4.50 pesetas the litre. Gasoline may be bought in the Cadiz consular district in Cadiz, Jeres de la Frontera, Sanlucar de Barrameda and at Algeciras. Trade conditions in the automobile market are described as being in a chaotic state.

Truck Sales Managers Urge N.A.D.A. Benefits

DETROIT, April 25—The Motor Truck Sales Managers' Association has prepared for truck manufacturers a form letter which will be sent to dealers urging them to affiliate with the commercial vehicle division of the National Automobile Dealers' Association. The letter states that the N. A. D. A. is the best investment on the market to-day and that membership in it is certain to bring substantial business profits. The letter outlines some of the activities of the association and points out that the commercial vehicle division, devoted exclusively to truck dealers, gives advice in regard to employment. taxes, legislation, advertising, highway construction and trade information in addition to various other helpful activities.

E. A. E. A. TO HELP BOOST SALES

NEW YORK, April 25—The Eastern Automotive Equipment Association, composed of jobbers in the states along the Atlantic seaboard from Maine to the District of Columbia, decided to-day to conduct an educational campaign to assist dealers in merchandising car and truck equipment. A campaign of dealer helps and selling ideas will be worked out and placed in the hands of the jobbers' customers.

Stockholder Action on Goodyear Delayed

(*Continued on page* 936)

The net earnings naturally will be larger under the reorganization plan and new banking control, for complete revision of the company's office and factory personnel has made for materially increased individual and collective efficiency. At the same time overhead expenses have been reduced, non-essential and non-productive activities have been stopped, and the company is down to the cold business of making tires.

No funds will be needed for plant extension or new equipment. Wages and salaries have been reduced 15 to 30 per cent. Also, instead of issuing stock against surplus funds, as has been done in the past, these surpluses will become available for the funded debt.

The company will also, it is expected, curtail its advertising appropriations. Last year Goodyear became known as the world's largest advertiser, with an advertising appropriation originally of $5,000,000 but later increased and nearly doubled. The company is now reaping the reward of this extensive advertising campaign and is showing a more rapid return to normal production than any other tire company in Akron. With automobile factories back on a basis of 60 per cent normal, and with Goodyear furnishing a large percentage of all original tire equipment, the company is not only working on production tickets for heavy tire specifications from manufacturers, but on steadily increasing orders for Goodyear products from all parts of the world.

Goodyear's sales in 1919 were $169,000,000, and for the first six months of 1920 reached $104,000,00, having reached the figure of nearly $1,000,000 a day when the slump came in the tire industry. With the company gradually climbing back to its normal production, it is a conservative prediction that Goodyear sales for the ensuing fiscal year easily will approximate $140,000,000.